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FINAL AMENDED PHASE 1 RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT FOR SOLID WASTE MANAGEMENT UNIT 75 NAVAL ACTIVITY PUERTO RICO

2/1/2014

CH2MHILL

Final

Amended Phase I RCRA Facility Investigation Report for Solid Waste Management Unit 75

Naval Activity Puerto Rico
Ceiba, Puerto Rico

Contract Task Order JM05

February 2014

Prepared for

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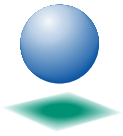
Prepared by



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Acronyms and Abbreviations

µg/kg	microgram per kilogram
amsl	above mean sea level
AOC	Area of Concern
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CLEAN	Comprehensive Long-term Environmental Action—Navy
CSM	conceptual site model
DAF	dilution attenuation factor
ECP	Environmental Condition of Property
ELCR	excess lifetime cancer risk
HI	hazard index
HQ	hazard quotient
IDW	investigation-derived waste
LUC	land use control
MCL	maximum contaminant level
mean+2S	mean plus 2 standard deviations
mg/kg	milligram per kilogram
mg/L	milligram per liter
NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NFA	no further action
NSRR	Naval Station Roosevelt Roads
OSWER	Office of Solid Waste and Emergency Response
PAH	polycyclic aromatic hydrocarbon
ppm	part per million
PREQB	Puerto Rico Environmental Quality Board
PRWQS	Puerto Rico Water Quality Standards
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act Field Investigation
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons

UCL	upper confidence limit
UFP	Uniform Federal Policy
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

SECTION 1

Introduction

This report amendment presents the data, results, and conclusions of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) 75, Naval Activity Puerto Rico (NAPR), in Ceiba, Puerto Rico. This Amended Phase I RFI Report was prepared in accordance with the United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Comprehensive Long-term Environmental Action—Navy (CLEAN) 1000, Contract N62470-06-D-1000, Contract Task Order JM05.

The United States Environmental Protection Agency (USEPA) issued a RCRA § 7003 Administrative Order on Consent (USEPA Docket No. RCRA-02-2007-7301) to the Navy in 2007 (USEPA, 2007). SWMU 75 was included due to the documented releases of solid and/or hazardous waste identified during the 2004 Environmental Condition of Property (ECP) study (LANTDIV, 2005) that then mandated a Phase I RFI be performed on the site. A Revised Final Phase I RFI Report for SWMU 75 was issued in September 2011 (Baker, 2011); however, based on a re-evaluation of the data and consensus by the stakeholder agencies, it was determined soil, surface water, and sediment had been sufficiently addressed, but that an additional round of groundwater sampling was warranted. Therefore, a Sampling and Analysis Plan (SAP) (CH2M HILL, 2012) was prepared to document the collection of groundwater samples at SWMU 75 in support of the Amended Phase I RFI, and field work was conducted in August 2012. This report presents a summary and evaluation of the data collected at SWMU 75 to-date and supersedes the Revised Final Phase I RFI Report (Baker, 2011).

1.1 Objectives and Approach

The goal of a Phase I RFI (also referred to as a Release Assessment), as outlined by Office of Solid Waste and Emergency Response (OSWER) (OSWER, 1994), is to evaluate potential hazardous waste releases and gather and evaluate data to support a determination of the need for further investigation or action. Therefore, this Amended Phase I RFI for SWMU 75:

- Determines whether a release of hazardous waste or hazardous constituents has occurred from past RCRA-related activities and, if so,
- Determines whether the suspected release warrants further investigation or action.

To achieve these objectives, the data obtained from the Site Characterization (BB&L, 1994), the ECP (LANTDIV, 2004), the Phase I RFI (Baker, 2011), and during the August 2012 field investigation (completed in accordance with the Revised Phase I RFI SAP [CH2M HILL, 2012]) were evaluated.

1.2 Report Organization

This Amended Phase I RFI Report comprises the following sections:

- Section 1 – Introduction
- Section 2 – Background and Description
- Section 3 – Additional Phase I RFI Activities
- Section 4 – Physical Characteristics
- Section 5 – Analytical Results and Data Evaluation
- Section 6 – Conclusions and Recommendations
- Section 7 – References

Tables and figures are provided at the end of each section.

SECTION 2

Background and Description

2.1 NAPR and SWMU 75 Background

NAPR, formerly Naval Station Roosevelt Roads (NSRR), consists of approximately 8,600 acres (USEPA, 2007) of land located on the east coast of Puerto Rico (**Figure 2-1**). NAPR is bordered to the west by mainland Puerto Rico, with the nearest municipality, Ceiba, to the west and north, and the municipality of Naguabo to the southwest. Fajardo is the nearest major town, located 8 miles to the north. NAPR is bordered on its three remaining sides by water: the Atlantic Ocean is to the north, and the Vieques Passage, which opens up into the Caribbean Sea, is to the south and east.

Military activity in the area started in 1941 when Fort Bundy was established on what is now the southwest portion of NAPR (LANTDIV, 2005). Fort Bundy was the headquarters for coastal artillery emplacements. In 1943, NSRR was established on the northeast portion of what is now NAPR. NSRR provided both training and support to the Atlantic fleet operations throughout the Caribbean. Fort Bundy and NSRR both remained active until the end of World War II, and were then maintained between World War II and 1957, both being deactivated and reactivated several times throughout this time. In 1957, Fort Bundy was incorporated into NSRR. NSRR then became home to the Atlantic Fleet Guided Missile Training Operations Center, which provided missile support facilities and training to Atlantic fleet submarine units. The facility was then commissioned separately as the Atlantic Fleet Weapons Training Facility shortly after the Cuban Missile Crisis in 1963. As a result of the United States treaty with Panama in 1979 that stipulated the United States would remove its military presence from Panama, the United States relocated the Special Operations Command South to NSRR in 1999 and 2000.

When the 2004 Defense Appropriations Act was signed on September 30, 2003, it stipulated that NSRR was to be disestablished within 6 months, and that the real estate disposal and transfer would be carried out according to procedures outlined in Base Realignment and Closure 1990 (LANTDIV, 2005). Therefore, on March 31, 2004, NSRR was closed and NAPR was established to oversee the property as caretaker and to assist in the property transfer (LANTDIV, 2005). Currently, the Government of Puerto Rico owns the land that contains SWMU 75. The Navy transferred the land as part of the Economic Development Conveyance parcel on January 12, 2012; however, the Navy retained the responsibility for site characterization and, if necessary, corrective action. Groundwater and soil land use controls (LUCs) were implemented at SWMU 75 as a result of the investigation activities and the site is currently not in use.

In anticipation of the NSSR closure and the sale and transfer of property, a Draft Phase I ECP Report (LANTDIV, 2004) was prepared to document the environmental conditions of NSRR based on investigations, interviews, and a review of available information and data. The objective of the ECP Report was to categorize all of the property on NSRR and to determine the presence, likely presence, release, or likely release of any hazardous substance or petroleum product. A Phase II ECP investigation was performed to provide supplemental data to evaluate the SWMUs, Areas of Concern (AOCs), and ECP sites that had been identified and to determine a further course of action. The Phase I/II ECP Report (LANTDIV, 2005) recommended that further investigation activities occur for many sites, including SWMU 75 (formerly ECP Site 21), in the form of a Phase I RFI.

2.2 SWMU 75 Description and Previous Investigations

2.2.1 Site Description

SWMU 75 is less than 0.25 acre in size and is located along the waterfront area next to Pier 3, which is within the former Fueling Piers Area of the facility (**Figure 2-1**). SWMU 75 includes Building 803, the pump house for the former emergency fire deluge system, which is approximately 100 feet from Ensenada Honda. Building 803 is bounded on the northwest by Building 978, containing a large electrical transformer, and on the southeast by Building 896 (SWMU 74 – fuel pipelines and valves). Small grassy areas are located to the immediate northeast

and southwest of Building 803, but the majority of the area around and including SWMU 75 is industrial and covered by concrete and asphalt (**Figure 2-2**).

A former underground storage tank (UST) (UST #803) was located on the southwest side of Building 803. The depth of the UST is unknown but would have been located above the water table, which is present at approximately 8 feet below ground surface (bgs). Until its removal in 1993, the UST stored diesel fuel for the pump house backup generator. Subsequently, fuel for the backup generator was stored in an aboveground storage tank (AST) adjacent to the former location of the UST. The floor of the building contains a subsurface access area to a concrete trench directly connected to Ensenada Honda, which is subject to wave and tidal action (**Figure 2-2**). The trench was used to extract seawater for the fire deluge system.

2.2.2 Previous Investigations

Previous investigations and reports for SWMU 75 are summarized as follows. Sample locations from all investigations associated with SWMU 75 are presented on **Figure 2-3**.

- **Site Characterization for Site 803 (Blasland, Bouck, & Lee, Inc., 1994)**

  A site characterization report was completed for Building 803 in 1994 as a result of the UST removal. Five subsurface soil samples were collected from boring locations and five monitoring wells were installed and sampled. Samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH), and four of the wells were also analyzed for polycyclic aromatic hydrocarbons (PAHs) and total lead. Soil and groundwater results were below laboratory detection limits for BTEX and TPH. PAHs (acenaphthene, fluorene, phenanthrene+anthracene, and naphthalene) and lead were detected in the groundwater. However, there were no Puerto Rico Environmental Quality Board (PREQB) standards or federal maximum contaminant levels (MCLs) for the PAHs that were detected, and lead was detected below the USEPA action level for drinking water. Based on the results of the investigation, no further action (NFA) as a result of a potential release from the former UST was recommended. Groundwater and soil results from the 1994 UST removal are provided in **Tables 2-1 and 2-2**, respectively.

- **Phase I/II ECP (LANTDIV, 2005)**

  A Phase I/II ECP assessment was conducted in 2005, during which the presence of discarded oil filters, stains on the floor, and batteries were noted inside the building. Four wipe samples were collected on the floor and walls of the building and analyzed for Appendix IX semivolatile organic compounds (SVOCs), polychlorinated biphenyls, and metals. Two SVOCs, bis(2-ethylhexyl)phthalate and di-n-butylphthalate, and all of the Appendix IX metals were detected in the wipe samples. It was noted that lead exceeded the Toxic Substances Control Act standard for residential use of the building (**Table 2-3**). Further investigation to determine whether contamination may be present outside the building as a result of the findings inside Building 803 was recommended. However, although batteries and stains on the floor were noted, prompting the collection of wipe samples, the few non-metal detections and low concentrations of all constituents detected suggest releases were likely very minor, consistent with minor drips and spills commonly associated with normal operations and maintenance of equipment.

- **Phase I RFI for SWMU 75 (Baker, 2011)**

  A Phase I RFI was conducted in 2010 to further characterize the site based on the results of the Phase I/II ECP. Five surface and nine subsurface soil samples were collected and analyzed for Appendix IX volatile organic compounds (VOCs), SVOCs, and metals, as wells as herbicides, TPH gasoline range and diesel range organics, and explosives. The results are shown on **Tables 2-4** and **2-5**. Based on the presence of SVOCs and metals in soil above screening levels and background and limited groundwater data, additional soil and groundwater data collection from the site, and sediment data collection from Ensenada Honda adjacent to the site, were recommended in the Amended Phase I RFI Report (Baker, 2011). However, upon further evaluation of the data and concurrence among the stakeholder agencies (Navy, USEPA, and PREQB), it was agreed that the existing soil data were sufficient in terms of spatial extent and analytical parameters to characterize the nature and extent of contamination and associated human health and ecological risks and that no additional

soil sampling was necessary for SWMU 75. In addition, the aquatic area (sediment and surface water) of Ensenada Honda near SWMU 75 was previously addressed as AOC D and closed out with NFA as part of AOC D, as noted in the RCRA Consent Order (USEPA, 2007). Therefore, no additional investigation of Ensenada Honda was concurred upon by the stakeholder agencies. However, given that the groundwater data previously collected were more than 15 years old, the stakeholder agencies agreed that the previous samples may not adequately represent the current groundwater conditions and agreed to collect another round of samples.

- **Uniform Federal Policy (UFP) SAP for SWMU 75 (CH2M HILL, 2012)**

  Based on the previously described stakeholder agency concurrence, a UFP-SAP was developed that summarized and evaluated the historical data collected at SWMU 75 and provided the rationale and approach for collecting another round of groundwater samples.

TABLE 2-1
Site Characterization Groundwater Results
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico
Ceiba, Puerto Rico

Station Name	**RSLs - Tapwater Adjusted**	**Federal MCLs**	**PR Water Quality Standards**	**PREQB UST Standards**	803-MW1	803-MW2		803-MW3	803-MW4	803-MW5
Sample Name					803-MW1	803-MW2	803-DUPLICATE	803-MW3	803-MW4	803-MW5
Date					3/12/1994	3/12/1994	3/12/1994	3/12/1994	3/12/1994	4/21/1994
Chemical Name										
Volatile Organic Compounds (µg/L)										
Benzene	0.39	5	5	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	860	1,000	1,000	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl-Benzene	1.3	700	530	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	190	10,000	--	10,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total BTEX	--	--	--	--	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Methyl-tert-butyl ether (MTBE)	12	--	--	20	<10	<10	<10	<10	<10	<10
Semivolatile Organic Compounds (µg/L)										
PAHs	--	--	--	--	NA	<10	<10	<10	NA	125
Total Naphthalenes	0.14	--	--	--	NA	<10	<10	<10	NA	32
Total Metals (mg/L)										
Lead	--	0.015	0.015	50	NA	<0.0050	0.0061	NA	<0.0050	<0.0050
Total Petroleum Hydrocarbons (mg/L)										
TPH	--	--	--	50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:

Total Xylenes - Sum of o, m, p-xylenes

Total BTEX - Sum of benzene, toluene, ethylbenzene and total xylene

PAHs - Polynuclear Aromatic Hydrocarbons (excluding napththalenes)

Duplicate sampled collected from 803-MW2

TPH - Total Petroleum Hydrocarbons

"--" - no screening criteria established

NA - constituent not analyzed for

µg/L - micrograms per liter

mg/L - milligrams per liter

Shaded cells represent detections above the laboratory detection limit

TABLE 2-2
Site Characterization Soil Results
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico
Ceiba, Puerto Rico

Station ID	**CLEAN NAPR Maximum Background - Sand/Silt Subsurface Soil**	**CLEAN NAPR Mean +2S Background - Sand/Silt Subsurface Soil**	**RSLs Industrial Soil Adjusted**	**RSLs Residential Soil Adjusted**	**RSLs MCL-Based SSLs**	**RSLs Risk-Based SSLs**	**PREQB UST Standards**	803-SB1	803-SB2	803-SB3		803-SB4	803-SB5
Sample Name								803-SB1	803-SB2	803-SB3	803-Duplicate	803-SB4	803-SB5
Depth (feet below ground surface)								4 - 6	4 - 6	4 - 6	4 - 6	4 - 6	4 - 6
Chemical Name													
Volatile Organic Compounds (µg/kg)													
Total BTEX	--	--	--	--	--	--	--	<5	<5	<5	<5	<5	<5
Field Total BTEX	--	--	--	--	--	--	--	<5	<5	<5	NA	<5	<5
Total Petroleum Hydrocarbons (mg/kg)													
TPH	--	--	--	--	--	--	100	<10	<10	<10	<10	<10	<10
Field TPH	--	--	--	--	--	--	100	<10	<10	<10	NA	<10	<10

Notes:

TPH - Total Petroleum Hydrocarbon

Total BTEX - Sum of benzene, toluene, ethylbenzene and total xylenes

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

"--" - no screening criteria established

NA - constituent not analyzed for

TABLE 2-3

ECP Wipe Sample Detections

Amended Phase I RFI for SWMU 75

Naval Activity Puerto Rico

Ceiba, Puerto Rico

Station ID	21E-WS01	21E-WS02	21E-WS03		21E-WS04
Sample ID	21E-WS01	21E-WS02	21E-WS03	21E-WS03D	21E-WS04D
Sample Date	05/09/04	05/09/04	05/09/04	05/09/04	05/09/04
Chemical Name					
Semivolatile Organic Compounds (ug/100 cm^2)					
bis(2-Ethylhexyl)phthalate	3.8 J	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	1.7 J	10 U	10 U
Total Metals (mg/100 cm^2)					
Antimony	0.00059	0.00032	0.00004 B	0.000075 B	0.0001 B
Arsenic	0.0035	0.0012	0.0005 U	0.0001 B	0.00021 B
Barium	0.061	0.015	0.0007	0.0012	0.0017
Beryllium	0.00019	0.000092	0.000006 B	0.000007 B	0.00001 B
Cadmium	0.021	0.0025	0.00068	0.00081	0.0006
Chromium	0.087	0.039	0.00087	0.0018	0.0013
Cobalt	0.0095	0.0025	0.0001 B	0.0002 B	0.00015 B
Copper	0.64	0.046	0.012	0.0073	0.0041
Lead	0.39	0.062	0.0045	0.0062	0.0083
Mercury	0.000033	0.00002	0.00002 U	0.00002 U	0.00002 U
Nickel	0.023	0.02	0.00053	0.00075	0.00067
Selenium	0.00012 B	0.000073 B	0.000025 U	0.00025 U	0.00004 B
Silver	0.00012 B	0.00015 B	0.000006 B	0.0005 U	0.00002 B
Thallium	0.00005 B	0.000021 B	0.0001 U	0.00007 B	0.0001 U
Tin	0.0099	0.0037	0.0015 B	0.0019 B	0.0014 B
Vanadium	0.025	0.0094	0.0004 B	0.00065	0.0021
Zinc	1.3	0.22	0.043	0.057	0.035

Notes:

Shaded cells represent detections

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

U - The constituent was analyzed for, but not detected

mg/100 cm2 - milligrams per 100 centimeters squared

TABLE 2-4

Phase I RFI Surface Soil Detections and Exceedances

Amended Phase I RFI for *SWMU 75*

Naval Activity Puerto Rico

Ceiba, Puerto Rico

Station ID	CLEAN NAPR Background Maximum Background - Surface Soil	CLEAN NAPR Mean +2S Background - Surface Soil	RSLs Industrial Soil Adjusted	RSLs Residential Soil Adjusted	CLEAN RSLs MCL-Based SSLs at DAF 1	CLEAN RSLs Risk-Based SSLs at DAF 1	Eco Soil Screening Value	75SB01	75SB02	75SB03	75SB04		75SB05
Sample ID								75SB01-00	75SB02-00	75SB03-00	75SB04-00	75SB04-00D	75SB05-00
Sample Date								03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10
Chemical Name													
Semivolatile Organic Compounds (UG/KG)													
2-Methylnaphthalene	--	--	370,000	31,000	--	140	PAH (LMW)	9 U	9.9 U	9 U	8.8 U	0.72 J	9 U
Acenaphthene	--	--	3,300,000	340,000	--	4,100	PAH (LMW)	42	9.9 U	9 U	8.8 U	8.7 U	9 U
Acenaphthylene	--	--	3,300,000	340,000	--	4,100	PAH (LMW)	12	2.6 J	68	3.2 J	3.5 J	22
Anthracene	--	--	17,000,000	1,700,000	--	42,000	PAH (LMW)	570	9.9 U	72	8.8 U	4.9 J	25
Benzo(a)anthracene	--	--	2,100	150	--	10	PAH (HMW)	1,300 J	9.9 UJ	95 J	8.8 UJ	31	91 J
Benzo(a)pyrene	--	--	210	15	240	3.5	PAH (HMW)	840	12	130	12 J	34 J	88
Benzo(b)fluoranthene	--	--	2,100	150	--	35	PAH (HMW)	720	9.6 J	260	18 JN	39 J	120 J
Benzo(g,h,i)perylene	--	--	1,700,000	170,000	--	9,500	PAH (HMW)	460	15 J	310	38 J	31	56 J
Benzo(k)fluoranthene	--	--	21,000	1,500	--	350	PAH (HMW)	1,100 J	8.5 J	300	17 JN	47 J	110 J
bis(2-Ethylhexyl)phthalate	--	--	120,000	35,000	1,400	17	30,000	76 J	200 U	44 J	70 J	44 J	880
Butylbenzylphthalate	--	--	910,000	260,000	--	200	30,000	62 J	200 U	180 U	180 U	180 U	180 U
Chrysene	--	--	210,000	15,000	--	1,100	PAH (HMW)	940	6.6 J	88	11 J	27 J	87
Dibenz(a,h)anthracene	--	--	210	15	--	11	PAH (HMW)	60 J	3.4 J	36 J	8.8 U	8.7 U	16 J
Dibenzofuran	--	--	100,000	7,800	--	110	--	30 J	200 U	180 U	180 U	180 U	180 U
Fluoranthene	--	--	2,200,000	230,000	--	70,000	PAH (LMW)	2,300 J	10	85	13 J	41 J	170
Fluorene	--	--	2,200,000	230,000	--	4,000	PAH (LMW)	37	9.9 U	9 U	8.8 U	8.7 U	9 U
Indeno(1,2,3-cd)pyrene	--	--	2,100	150	--	120	PAH (HMW)	690 J	16 J	330 J	18 J	30 J	80 J
Naphthalene	--	--	18,000	3,600	--	0.47	PAH (LMW)	9 U	9.9 U	9 U	8.8 U	0.99 J	9 U
PAH (HMW)	--	--	--	--	--	--	18,000	7,910	81.0	1,626	NA	286	788
PAH (LMW)	--	--	--	--	--	--	29,000	4,718	142	346	NA	154	340
Phenanthrene	--	--	17,000,000	1,700,000	--	42,000	PAH (LMW)	1,700 J	9.9 U	13	8.8 U	3.9 J	15
Pyrene	--	--	1,700,000	170,000	--	9,500	PAH (HMW)	1,800 J	9.9 U	77	14 J	43 J	140
Total Metals (MG/KG)													
Arsenic	2.5	2.65	1.6	0.39	0.29	0.0013	18.0	1.4 J	2.8 J	2.4 J	1 J	0.52 UJ	3.9 J
Barium	220	199	19,000	1,500	82	120	330	16.1	11.2	23.8	86.5	101	52.8
Beryllium	0.58	0.59	200	16	3.2	13	40.0	0.54 U	0.58 U	0.52 U	0.11 J	0.12 J	0.078 J
Cadmium	0.92	1.02	80	7.0	0.38	0.52	32.0	0.95	0.085 J	0.37 J	0.27 J	0.22 J	0.2 J
Chromium	47.0	49.8	5.6	0.29	180,000	0.00059	64.0	9.7	5.4	12.1	14	14.9	9.1
Cobalt	50.2	46.2	30	2.3	--	0.21	13.0	1.7	1.4	2.5	11.4	13.2	3.7
Copper	180	168	4,100	310	46	22	70.0	23	6.5	22.2	74.3	90.9	19.5
Lead	21	22	800	400	14	--	120	45.9	1.5	37	6.6 R	1.9 R	9.8
Mercury	0.12	0.109	31	2.3	0.10	0.033	0.10	0.018 J	0.039 U	0.036 U	0.009 J	0.035 U	0.007 J
Nickel	19.0	20.7	2,000	150	--	20	38.0	5.9	4.9	5.7	7.7	7.4	6.3
Selenium	1.2	1.48	510	39	0.26	0.40	0.52	0.33 J	0.45 J	0.31 J	0.37 J	0.27 J	0.46 J
Silver	--	--	510	39	--	0.60	560	0.41 J	0.062 J	0.089 J	0.1 J	0.1 J	0.095 J
Thallium	0.1	--	1.0	0.078	0.14	0.011	1.00	0.14 J	0.038 J	0.042 J	0.099 J	0.1 J	0.059 J
Vanadium	230	259	520	39	--	78	130	11.9 J	6.7 J	20.1 J	81.2 J	85.1 J	25.6 J
Zinc	120	115	31,000	2,300	--	290	120	84.3	6.9	22.5	61.6	61.4	30.6
Total Petroleum Hydrocarbons (UG/KG)													
TPH-diesel range	--	--	--	--	--	--	--	11,000 U	12,000 U	30,000	11,000 U	12,000	11,000 U

Notes:

Exceedances of background and RSLs or SSLs

Exceedances of background and eco screening values

"--" - no screening criteria established

J - Analyte present, value may or may not be accurate or precise

JN - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

NA - Not analyzed

R - Unreliable Result

U - The analyte was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram

PAH (HMW) - polyaromatic hydrocarbon high molecular weight

PAH (LMW) - polyaromatic hydrocarbon low molecular weight

TABLE 2-5

Phase I RFI Subsurface Soil Detections and Exceedances

Amended Phase I RFI for SWMU 75

Naval Activity Puerto Rico

Ceiba, Puerto Rico

Station ID	CLEAN NAPR Maximum Background - Sand/Silt Subsurface Soil	CLEAN NAPR Mean +2S Background - Sand/Silt Subsurface Soil	RSLs Industrial Soil Adjusted	RSLs Residential Soil Adjusted	RSLs MCL-Based SSLs at DAF 1	RSLs Risk-Based SSLs at DAF 1	75SB01			75SB02		75SB03		75SB04		75SB05
Sample ID							75SB01-01	75SB01-01D	75SB01-04	75SB02-01	75SB02-04	75SB03-01	75SB03-04	75SB04-01	75SB04-04	75SB05-01
Sample Date							03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10	03/29/10
Chemical Name																
Semivolatile Organic Compounds (UG/KG)																
Acenaphthylene	--	--	3,300,000	340,000	--	4,100	21	190 U	11 U	5 J	0.99 J	10 U	1.6 J	5.1 J	13	14
Anthracene	--	--	17,000,000	1,700,000	--	42,000	40	25 J	11 U	16 U	11 U	10 U	9.9 U	9.3 U	14	18
Benzo(a)anthracene	--	--	2,100	150	--	10	36 J	120 J	11 UJ	71 J	11 U	10 UJ	9.9 UJ	9.3 UJ	20 J	68 J
Benzo(a)pyrene	--	--	210	15	240	3.5	72	200 J	11 U	47	1.1 J	10 U	4.9 J	13	45	83
Benzo(b)fluoranthene	--	--	2,100	150	--	35	57 J	260 J	11 UJ	37 J	1.3 J	10 UJ	5.5 J	14 J	24 J	41 J
Benzo(g,h,i)perylene	--	--	1,700,000	170,000	--	9,500	73 J	110 J	11 U	32 J	1.4 J	10 U	6.1 J	19 J	31 J	49 J
Benzo(k)fluoranthene	--	--	21,000	1,500	--	350	60 J	260 J	11 UJ	33 J	1.6 J	10 UJ	5.3 J	7.8 J	37 J	71 J
bis(2-Ethylhexyl)phthalate	--	--	120,000	35,000	1,400	17	190 U	190 U	75 J	190 U	220 U	210 U	200 U	42 J	200 U	77 J
Butylbenzylphthalate	--	--	910,000	260,000	--	200	190 U	190 U	220 U	110 J	220 U	210 U	200 U	190 U	200 U	190 U
Chrysene	--	--	210,000	15,000	--	1,100	37	170 J	11 U	50	0.92 J	10 U	3.9 J	5.5 J	18	54
Dibenz(a,h)anthracene	--	--	210	15	--	11	17 J	30 J	11 U	9.5 J	11 U	10 U	0.96 J	4 J	10 U	16 J
Fluoranthene	--	--	2,200,000	230,000	--	70,000	24	62 J	11 U	110	11 U	10 U	3.4 J	3.9 J	5.2 J	58
Indeno(1,2,3-cd)pyrene	--	--	2,100	150	--	120	87 J	120 J	11 UJ	46 J	1.9 J	10 UJ	8.3 J	23 J	45 J	70 J
Phenanthrene	--	--	17,000,000	1,700,000	--	42,000	9.1 U	190 U	11 U	41	11 U	10 U	9.9 U	9.3 U	10 U	9.1 U
Pyrene	--	--	1,700,000	170,000	--	9,500	32	110 J	11 U	87	11 U	10 U	9.9 U	9.3 U	10 U	67
Total Metals (MG/KG)																
Antimony	4.6	7.44	41	3.1	0.27	0.27	1 UJ	1.1 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.2 UJ	1.2 UJ	0.52 J	1.2 UJ	1.1 UJ
Arsenic	3.4	6.6	1.6	0.39	0.29	0.0013	2.8 J	3 J	2.6 J	3.4 J	2.1 J	2.8 J	4.2 J	13.3 J	2.3 J	2 J
Barium	180	207	19,000	1,500	82	120	16	16.3	6.8	15.5	6.4	8.8	8	13.1	8.7	22.8
Beryllium	0.87	0.93	200	16	3.2	13	0.046 J	0.55 U	0.59 U	0.54 U	0.61 U	0.59 U	0.59 U	0.56 U	0.58 U	0.55 U
Cadmium	0.62	0.57	80	7.0	0.38	0.52	0.95	0.77	0.59 U	0.74	0.61 U	0.069 J	0.052 J	0.12 J	0.055 J	0.046 J
Chromium	52.0	47.9	5.6	0.29	180000	0.00059	14.8	13.5	2.5	10	2.3	6.9	7.5	18.6	2.6	4.6
Cobalt	73.4	63.1	30	2.3	--	0.21	2.7	2.7	0.55 J	2.6	0.53 J	1.4	2.3	3.4	0.64	1.5
Copper	131	120	4,100	310	46	22	58.4	41.4	2.1	15.1	1.7	4.7	4.6	13.8	1.9	6.9
Lead	7.8	6.2	800	400	14	--	76.6	68.9	0.58 J	22.3	0.28 J	0.95	0.68	3.2	0.4 J	3.2
Mercury	0.06	0.067	31	2.3	0.10	0.033	0.021 J	0.022 J	0.042 U	0.012 J	0.042 U	0.04 U	0.039 U	0.037 U	0.04 U	0.036 U
Nickel	26.0	26.5	2,000	150	--	20	7.5	6.2	4.2	5.9	4.1	5.3	5.5	8.2	4.8	3.7
Selenium	1	1.19	510	39	0.26	0.40	0.38 J	0.39 J	0.33 J	0.43 J	0.28 J	0.47 J	0.34 J	0.89 J	0.35 J	0.28 J
Silver	0.1	--	510	39	--	0.6	1.9	0.9	0.059 J	0.078 J	0.61 U	0.11 J	0.06 J	0.56 U	0.075 J	0.076 J
Thallium	--	--	1.0	0.078	0.14	0.011	0.079 J	0.065 J	0.044 J	0.074 J	0.032 J	0.06 J	0.049 J	0.13 J	0.034 J	0.032 J
Vanadium	232	256	520	39	--	78	17 J	18.5 J	2.8 J	17.1 J	2.8 J	11.1 J	27.6 J	43.7 J	3.5 J	12.4 J
Zinc	98.5	92	31,000	2,300	--	290	100	80.5	2 J	48.1	1.7 J	4	4.2	13.8	1.6 J	6.6
Total Petroleum Hydrocarbons (UG/KG)																
TPH-diesel range	--	--	--	--	--	--	25,000	11,000 U	13,000 U	11,000 U	13,000 U	12,000 U	12,000 U	11,000 U	12,000 U	11,000 U

Notes:

Shaded cells indicate exceedances of background and regulatory screening criteria

"--" - no screening criteria established

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

R - Unreliable Result

U - The analyte was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram

Legend

- Road
- Expressway
- SWMU 75 Boundary
- Naval Activity Puerto Rico Boundary

N
W E
S

0 1 2 Miles

1 in = 1 mile

Figure 2-1
Site Location
Amended Phase I RFI for SWMU 75 Naval Activity Puerto Rico

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Legend

- Underground Concrete Trench (Ocean Water Conduit)
- Former UST Location
- Building 803
- SWMU 75 Boundary

N
W E
S

0 50 100 Feet

1 inch = 50 feet

Figure 2-2
Site Layout
Amended Phase I RFI for SWMU 75 Naval Activity Puerto Rico

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Monitoring Well Location
Soil Boring Location (2010) (Surface and Subsurface Soil Samples)
Soil Boring Location (1994) (Subsurface Soil Samples)
Former UST Location
Underground Concrete Trench (Ocean Water Conduit)
Groundwater Contour (Dashed Where Inferred)
Building 803, Four Interior Wipe Samples (2004)
SWMU 75 Boundary

N
W E
S

0 25 50
Feet
1 inch = 50 feet

Figure 2-3
SWMU 75 Sample Locations
Amended Phase I RFI for SWMU 75 Naval Activity Puerto Rico

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SECTION 3

Additional Phase I RFI Activities

As previously noted, following finalization of the Revised Final Phase I RFI Report (Baker, 2011), a comprehensive evaluation of the data and development of a conceptual site model (CSM) were conducted, as documented in the Final Revised Phase I RFI SAP for SWMU 75 (CH2M HILL, 2012) and further discussed in **Section 5** of this report. Although the historical groundwater data from the 1994 UST removal suggested the location of monitoring wells provided appropriate spatial coverage of the site and the analytical parameters were appropriate for the potential contaminant sources present at the site, it was recognized that the data were more than 15 years old and may no longer adequately represent current groundwater conditions. Therefore, the stakeholder agencies agreed to collect another round of groundwater samples to represent current groundwater conditions at SWMU 75 (CH2M HILL, 2012).

3.1 Groundwater Sample Collection

Groundwater samples were collected from four existing monitoring wells at SWMU 75 in August 2012, conducted in accordance with the Revised Phase I RFI SAP (CH2M HILL, 2012). One existing groundwater monitoring well (803-MW01) at SWMU 75 was unable to be located, and is believed to have been destroyed during bulkhead restoration activities in the vicinity of the site. However, based on the location of the former UST and AST and the direction of groundwater flow, wells MW02 and MW05 are more appropriately located to evaluate potential releases. Sample locations are shown on **Figure 2-3**, and a sample summary is provided as **Table 3-1**.

Prior to collecting groundwater samples, existing monitoring wells were redeveloped using a submersible pump. At least three well volumes of water were purged, and redevelopment continued until water quality parameters stabilized and turbidity was reduced to the extent practicable. Redevelopment information, including turbidity, pH, specific conductivity, temperature, and gallons removed, was recorded in the field notes (**Appendix A**).

Groundwater sample were collected from each of the four existing monitoring wells (803-MW02 through 803-MW05) at SWMU 75. Sampling locations are shown on **Figure 2-3.** The samples were collected using a submersible pump following the low-flow sampling protocol (CH2M HILL, 2012). Water quality field parameters (pH, temperature, turbidity, conductivity, dissolved oxygen, and oxidation-reduction potential) were measured prior to sample collection and recorded on individual Well Detail and Sample Logs (**Appendix A**). All of the water quality field parameter measurements indicate the groundwater reached a stable state prior to sampling. The final water quality field parameters recorded prior to sampling are presented in **Table 3-2**.

The groundwater samples were collected into pre-labeled, laboratory-provided sample jars. The groundwater was field-filtered for the samples collected for dissolved lead analysis. The samples were placed on ice and shipped in coolers with chain-of-custody forms (**Appendix A**) to an offsite analytical laboratory for analysis. All of the groundwater samples were analyzed for PAHs, total and dissolved lead, and wet chemistry parameters (chloride, salinity, and total dissolved solids) in accordance with the SAP (CH2M HILL, 2012).

Depth-to-water was measured from the top of the polyvinyl chloride riser to the water table and recorded for each monitoring well prior to groundwater sampling activities. Groundwater level measurements were recorded in the field notes (**Appendix A**) and are summarized in **Table 3-3**.

Quality assurance (QA)/quality control (QC) samples were collected in accordance with the SAP (CH2M HILL, 2012). A summary of the QA/QC samples collected and their analyses is provided in **Table 3-1**.

3.2 Investigation-Derived Waste Management

Investigation-derived waste (IDW) generated during the field investigation consisted of well development and groundwater sampling purge water and decontamination fluids. Personal protective equipment, specifically nitrile gloves, used during the field event were disposed along with other general waste and were not included as IDW. The IDW was containerized in 55-gallon drums. One composite aqueous sample (NAPR-W75-IW01-082812) was

collected from drums containing development and purge water and decontamination fluid (**Table 3-1**). The IDW sample was analyzed for toxicity characteristic leaching procedure (TCLP) VOCs, TCLP metals, ignitability, reactive sulfide, reactive cyanide, and pH. The IDW analytical results indicated the wastes were non-hazardous and the IDW was disposed offsite at Penuelas Valley Landfill on January 11, 2013.

TABLE 3-1

Summary of Groundwater Sampling and Analytical Program - August 2012

Amended Phase I RFI for SWMU 75

Naval Activity Puerto Rico

Sample Media	Station ID	Sample ID	Sample Date/Time	Analysis Requested					Comments
				PAHs	Total Lead	Dissolved Lead	Wet Chemistry	Full TCLP & RCI	
Groundwater	803-MW02	NAPR-W75-GW02-0812	8/27/12 12:15	X	X	X	X		
	803-MW03	NAPR-W75-GW03-0812	8/27/12 17:35	X	X	X	X		
	803-MW04	NAPR-W75-GW04-0812	8/28/12 12:15	X	X	X	X		
		NAPR-W75-GW04-0812-MS	8/28/12 12:15	X	X				Matrix Spike
		NAPR-W75-GW04-0812-SD	8/28/12 12:15	X	X				Matrix Spike Duplicate
	803-MW05	NAPR-W75-GW05-0812	8/27/12 15:00	X	X	X	X		
		NAPR-W75-GW05P-0812	8/27/12 15:05	X	X	X			Field Duplicate
QA/QC - Equipment Rinsate Blanks	SWMU75-QC	NAPR-W75-EB-082712	8/27/12 18:30	X	X	X			Stainless Steel Monsoon Pump
	SWMU75-QC	NAPR-W75-EB-082812	8/28/12 13:35	X	X	X			Stainless Steel Monsoon Pump
Investigation Derived Waste	NA	NAPR-W75-IW01-082812	8/28/12 13:10					X	Purge Water

Notes:

PAHs - Polycyclic Aromatic Hydrocarbon

Wet Chemistry - Chloride, Salinity, Total Dissolved Solids

TCLP - Toxicity Characteristic Leaching Procedure

RCI - Reactivity, Corrosivity, Ignitability

TABLE 3-2

Water Quality Field Parameters - August 2012

Amended Phase I RFI for SWMU 75

Naval Activity Puerto Rico

Monitoring Well ID	Sample ID	Temperature (°C)	Specific Conductivity (uS/cm)	Salinity (ppt)	TDS (g/L)	DO (%)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)
803-MW02	NAPR-W75-GW02-0812	32.66	1732	0.86	1.125	5.7	0.41	6.94	60.1	3.75
803-MW03	NAPR-W75-GW03-0813	30.33	6799	3.67	4.417	1.4	0.1	7.03	-203.3	3.2
803-MW04	NAPR-W75-GW04-0814	30.31	4351	2.27	2.829	1.9	0.14	6.92	-87	4.17
803-MW05	NAPR-W75-GW05-0815	31.7	1038	0.51	0.675	2.2	0.16	6.92	6.7	15.6

Notes

°C - degrees Celsius

uS/cm - microsiemens per centimeter

ppt - parts per thousand

TDS - total dissolved solids

DO - dissolved oxygen

% - percent

mg/L - milligrams per liter

pH - pH units

ORP - oxidation reduction potential

mV - millivolts

NTU - nephelometric turbidity units

TABLE 3-3

Summary of Monitoring Well Specifications and Water Level Elevations

Amended Phase I RFI for SWMU 75

Naval Activity Puerto Rico

Monitoring Well ID	Date Installed	Top of Casing Elevation (ft. amsl)	Well Depth Feet (approx. bgs)	Screened Interval Feet (approx. bgs)	Groundwater Level March 12, 1994 Elev. (ft. amsl)	Groundwater Level March 21, 1994 Elev. (ft. amsl)	Groundwater Level April 25, 1994 Elev. (ft. amsl)	Groundwater Level May 11, 1994 Elev. (ft. amsl)	Groundwater Level August 27, 2012 Elev. (ft. amsl)
803-MW01	3/10/1994	9.76	15.0	5-15	0.35	0.34	0.23	0.26	NA
803-MW02	3/10/1994	9.05	15.0	5-15	0.27	0.26	0.14	0.14	0.44
803-MW03	3/10/1994	9.61	15.0	5-15	0.28	0.29	0.15	0.14	0.40
803-MW04	3/10/1994	9.13	15.0	5-15	0.45	0.39	0.13	0.12	0.43
803-MW05	4/19/1994	9.14	15.0	5-15	NA	NA	0.12	0.12	0.43

Notes:

amsl = above mean sea level

bgs = below ground surface

SECTION 4

Physical Characteristics

4.1 Regional Characteristics

4.1.1 Climate, Topography, and Hydrology

NAPR is characterized as having a tropical marine climate. The Easterly trade winds have a moderating affect on the tropical heat, resulting in minimal temperature fluctuations seasonally and a mean temperature of 79.9 degrees Fahrenheit (LANTDIV, 2005). NAPR maintains a relatively moderate humidity, with the average between 65 percent and 78 percent. Although rainfall across Puerto Rico varies regionally, showers are generally frequent but brief across most of Puerto Rico, including NAPR, where the average annual rainfall is 58 inches. During the rainy season between May and November, rainfall can average between 4.08 inches and 7.64 inches monthly. Areas immediately west and north of NAPR have considerably more rain, receiving between 70 to 100 inches annually. These areas include parts of the Rio Daguao watershed, within which portions of NAPR lie.

The region surrounding NAPR is predominantly a narrow coastal plain (LANTDIV, 2005). Some small valleys extend from the Sierra de Luquillo mountain range, which has been eroded by streams into deep valleys that can reach hundreds of feet deep with slopes of 60 percent. Topography within NAPR varies from the coastline to the western boundary, with elevations ranging from sea level to approximately 297 feet above mean sea level (amsl). A series of hills interspersed with broad flat valleys, coastal plains, mangrove, and marsh areas are present within NAPR.

Surface water that flows across NAPR originates in the eastern slopes of the Sierra de Luquillo mountain range (LANTDIV, 2005). Surface runoff flows into various rivers and streams that outfall into the Caribbean Sea. The Daguao River and Quebrada Seca Stream are the two watersheds that collect water from immediately north of NAPR and flow through NAPR, occasionally causing flooding during heavy rainfall. The combined watershed is approximately 7.6 square miles (4,864 acres), a third of which lies within NAPR boundaries. The Daguao River flows for approximately 700 feet before emptying into the Caribbean Sea at Bahia Algondones. Despite its close proximity, this watershed is not used as a source of water for NAPR. Since the 1942 agreement, NAPR receives water from the Rio Blanco watershed 11 miles west of NAPR.

4.1.2 Geology and Hydrogeology

The geology of NAPR is mainly volcanic rock, composed of lava, tuff, and sedimentary rocks from discontinuous limestone beds (LANTDIV, 2005). The geologic age ranges from early Cretaceous to Middle Eocene. In the Middle Tertiary timeframe, Puerto Rico was separated from the other major Antillean Islands and the rocks were completely faulted, folded, metamorphosed, and intruded by dioritic rocks. The northwestern and western regions within NAPR also have unconsolidated alluvial and old alluvial deposits from the Quarternary period. Various beach deposits, in addition to alluvium, quartz diorite, granodiorite, quartz keratophyre, the Daguao formation, and Figuera lava, form the primary geologic features on and near NAPR (LANTDIV, 2005). The Pena Pobre fault traverses NAPR (EEI, 1984).

There are six soil associations on NAPR, comprising one or more major soils and several minor soils. In some areas, a detailed classification of soils is impractical due to rocky, shallow, severely eroded, and variable soils. The six soil associations are Swamp-Marshes, Coloso-Toa-Bajura, Mabi-Rio Arriba Cayagua, Caguabo-Mucara-Naranjito, Descalabrado-Guayama, and Jacana-Amelia-Fraternidad. The regional geology of NAPR is described in more detail in the ECP Report (LANTDIV, 2005).

Confined or partially confined water-bearing units exist at NAPR, and may be the result of the Daguao formation acting as a semi-confining or confining unit, but limited information is available (LANTDIV, 2005). The characteristics of volcanic rock in the area and slow recharge rates contribute to the low permeability and water hardness observed at NAPR. Salt water intrusion is also present at NAPR, increasing as the depth of wells increase and the distance to the sea decreases.

4.2 SWMU 75 Characteristics

4.2.1 Topography, Setting, and Hydrology

A graphical CSM for SWMU 75 was developed and is presented on **Figure 4-1**. SWMU 75 is part of the near-shore area within the former Fueling Piers Area of the facility. SWMU 75 is relatively flat, with site drainage directed west-southwest toward Ensenada Honda. Although the majority of the area is industrial and covered by concrete and asphalt, the areas immediately surrounding Buildings 896, 803 (SWMU 75), and 978 are vegetated with grass and shrubs. There is very little terrestrial ecological habitat available in the area surrounding SWMU 75, due to the small size of the site and the lack of habitat and industrial nature of the area in the general vicinity (Baker, 2011). The aquatic area (sediment and surface water) of Ensenada Honda near SWMU 75 was previously addressed as AOC D, and no further investigation was determined to be warranted (USEPA, 2007).

4.2.2 Geology and Hydrogeology

The soil characteristics of the site include approximately 1 foot of brown silt and gravel underlain by tan silt and sand with shell and coral fragments indicative of beach sand fill to approximately 10 to 11 feet bgs, then transition to grey olive native marine deposits. The fill material was likely put in place to support the pier construction and operation. Geologic cross-sections are provided on **Figure 4-1**. Groundwater is encountered at 8 feet bgs within the fill, and observations indicate that it flows west-southwest toward Ensenada Honda. The 1994 Site Characterization Report indicated free product was not observed on the water table during tank removal activities. Furthermore, no free product has been observed during any of the groundwater sampling events. Potentiometric figures suggest that due to the site's close proximity to Ensenada Honda and the associated sea walls, groundwater flow and direction are likely influenced by the tides (Baker, 2011).

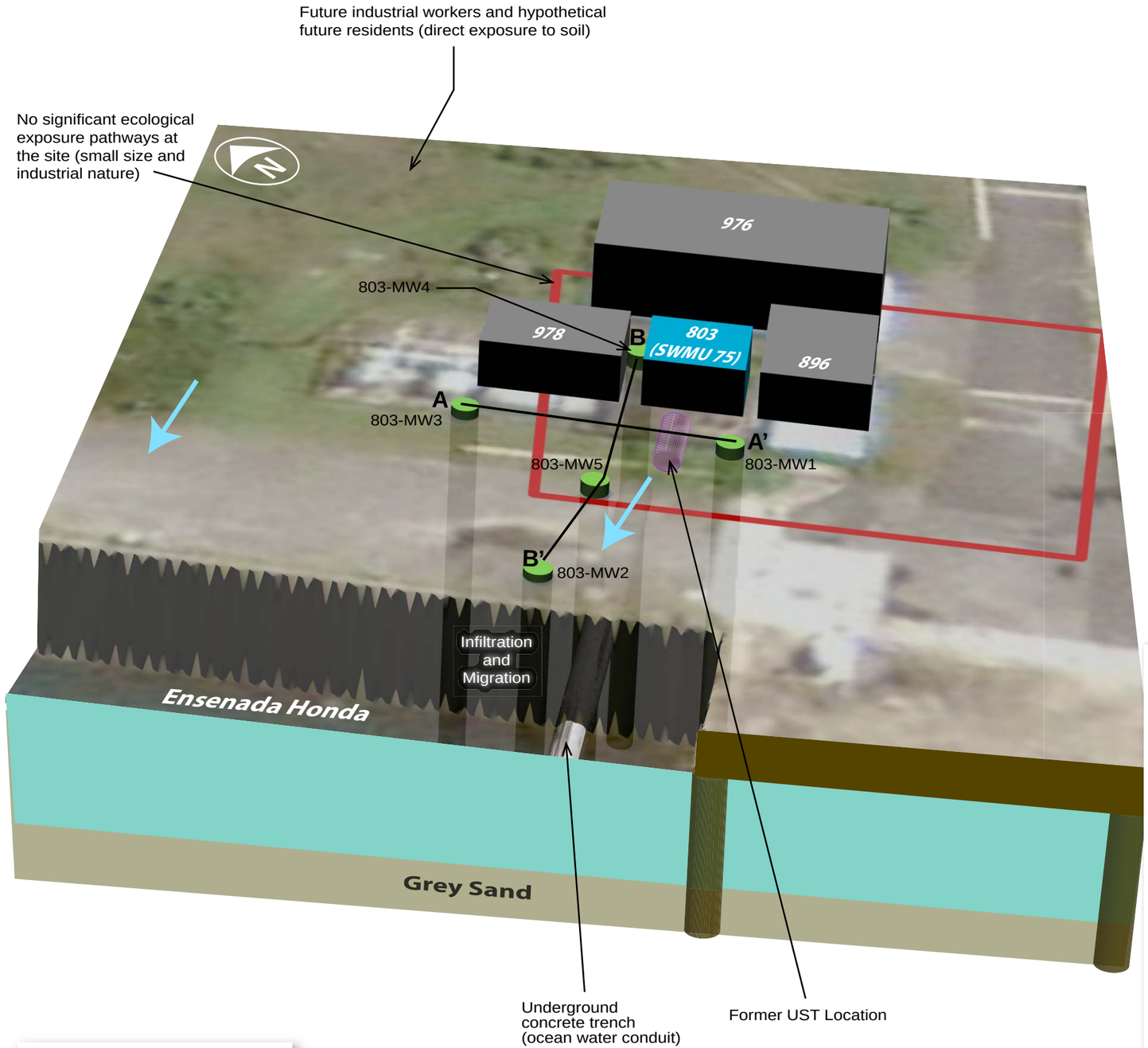
A water level survey was performed at SWMU 75 prior to collecting groundwater samples on August 27, 2012, during the most recent field investigation at SWMU 75. Groundwater elevations were collected from MW2, MW3, MW4, and MW5 and ranged between 0.4 and 0.44 foot amsl. The groundwater potentiometric figure for August 2012 is provided as **Figure 4-2**. **Figure 4-2** demonstrates the tidal affect on groundwater due to the site's very close proximity to Ensenada Honda, which is a common occurrence in tidally-influenced areas, whereby the increased pressure caused by high tide causes short-term gradient alterations/reversals in adjacent groundwater. Notwithstanding these short-term effects, the predominant groundwater flow direction at the site is west-southwest toward Ensenada Honda.

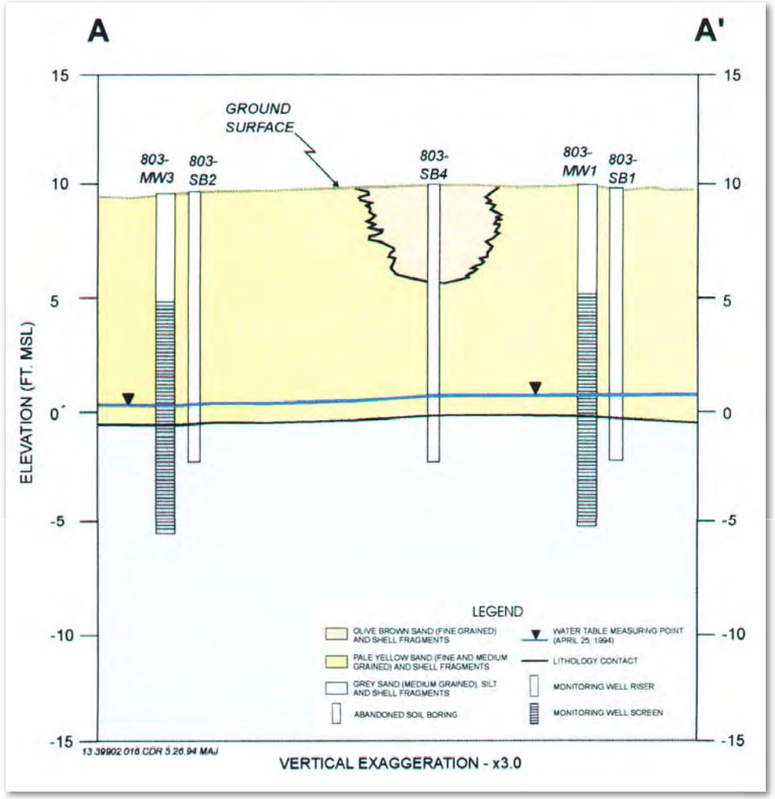
4.2.3 Current and Potential Future Site Uses

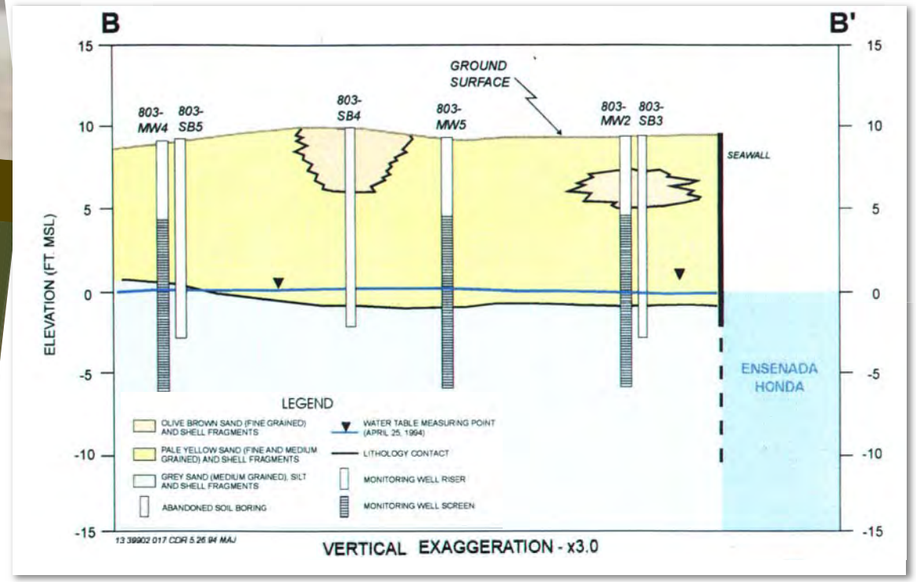
Currently, the Government of Puerto Rico owns SWMU 75. The Navy transferred the land as part of the Economic Development Conveyance parcel on January 12, 2012; however, the Navy retained the responsibility for site characterization and, if necessary, corrective action. Groundwater and soil LUCs were implemented at SWMU 75 as a result of ongoing investigation activities and the site is currently not in use.

Groundwater is not used as a source for potable water supply at or near NAPR due to generally high levels of total dissolved solids (650 to 45,000 milligrams per liter [mg/L]), salinity (660 parts per million [ppm] to 35,500 ppm), and low yield (less than 10 gallons per minute) relative to levels acceptable for potable use (LANTDIV, 2012). However, Section 1302.3(A) of Puerto Rico Water Quality Standards (PRWQS) (PREQB, 2010) classifies all groundwater in Puerto Rico as "SG", which is defined under Section 1303.2 (F) of the regulation as groundwater intended for use as a source of drinking water supply. Therefore, site-specific investigations will evaluate the groundwater characteristics relative to potable use suitability, and will consider potable use of groundwater in human health risk evaluations; corrective action determinations that do not include the requirement to achieve potable use standards are warranted for sites determined unsuitable for potable use based on naturally poor water quality and low yield. If groundwater at a particular site is determined to be suitable for potable use, corrective action determinations will consider achieving potable use standards (LANTDIV, 2012. The salinity values for the groundwater samples collected at GW02, GW03, and GW04 at SWMU 75 ranged from 860 ppm to 3679 ppm, which is within the range of salinity values determined to be unsuitable as a potable water source (660 ppm to 35,500 ppm). Treatment of the groundwater would be required prior to its use as a potable source.

Water at NAPR is currently supplied by a water treatment system that obtains its water from the Rio Blanco, approximately 11 miles upgradient of NAPR (LANTDIV, 2005). The 2011 Environmental Assessment of NAPR, conducted in support of the Land Reuse Plan (LRA, 2010), concluded that the groundwater resources within NAPR are not adequate to be used as a source of potable water and that the future land use of NAPR will be dependent on the existing water treatment system (Navy, 2011).







LEGEND

- Study Area Boundary
- Groundwater Flow Direction
- Grey Sand (medium grained)

Source of cross sections: Blasland, Bouck, & Lee, Inc. 1994. Site Characterization Site 803,. Roosevelt Roads U.S. Naval Station Ceiba, Puerto Rico. July.

FIGURE 4-1
Conceptual Site Model
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico

Legend

- Monitoring Well Location (water elevation ft amsl)
- Groundwater Contour (Dashed Where Inferred)
- Groundwater Flow Direction
- Underground Concrete Trench (Ocean Water Conduit)
- Building 803
- SWMU 75 Boundary

N
W E
S

0 15 30 Feet

1 inch = 30 feet

Figure 4-2
Groundwater Potentiometric Surface - August 27, 2012
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico

CH2MHILL

SECTION 5

Analytical Results and Data Evaluation

The Administrative Consent Order (USEPA, 2007) determined that SWMU 75 required additional investigation in the form of a Phase I RFI, based on results of the Phase I/II ECP Report (LANTDIV, 2005). As previously stated, the goal of a Phase I RFI is to:

- Determine whether a release of hazardous waste or hazardous constituents has occurred from past RCRA-related activities and, if so,
- Determine whether the suspected release warrants further investigation or action.

Data collected at SWMU 75 in 1994, 2004, and 2010 were evaluated during the 2012 SAP development process using a 6-step decision analysis process modified from a 7-step decision analysis process jointly developed by USEPA, PREQB, and the Navy for sites undergoing release assessment on Vieques (CH2M HILL, 2010). This process was determined to be appropriate for NAPR because it presents and appropriately evaluates the information to achieve the goal of a Phase I RFI (OSWER, 1994). The process was developed to determine whether a site-related release occurred and, if so, whether the suspected release warrants further evaluation. The data evaluation process used for previous data collected at SWMU 75 is presented on **Figure 5-1.** The results of the data evaluation process indicated additional groundwater samples were warranted in order to adequately represent current groundwater conditions at SWMU 75, given the previous data collected was more than 15 years old (CH2M HILL, 2012). Therefore, the Navy, in partnership with the USEPA and PREQB, agreed groundwater samples from the existing monitoring wells are warranted to obtain data on the current groundwater conditions at SWMU 75 (CH2M HILL, 2012).

Following the collection of additional groundwater samples in August 2012, the data evaluation for soil and groundwater at SWMU 75 was revised to include the most recent groundwater data. The revised data evaluation is provided in the following subsections.

5.1 SWMU 75 Data Evaluation Results

Following finalization of the Phase I RFI Report, a comprehensive evaluation of the data and development of a CSM were conducted, as documented in the Final Revised Phase I RFI SAP (CH2M HILL, 2012). The data evaluation was conducted to determine if the nature and extent of contamination at SWMU 75 was sufficiently delineated or if additional samples as part of a full RFI were warranted, as recommended in the Phase I RFI Report. The historical data for SWMU 75 were further evaluated using a 6-step decision analysis process, depicted on **Figure 5-1**, the results of which are detailed as follows. **Figures 5-2 and 5-3** present the surface and subsurface soil exceedances, respectively. **Figure 5-4** presents the groundwater detections; however, there were no exceedances of screening criteria. The data validation summary report for the most recent surface and subsurface soil investigation in 2010 and the groundwater investigation in 2012 is provided in **Appendix B**.

Step 1 – Does the data quality evaluation indicate the dataset as a whole is available and useful for the intended purpose?

- **Site Characterization Report** – Subsurface soil data collected as part of the site characterization report (Blasland, Bouck & Lee, Inc., 1994) supported the NFA determination for the UST. However, additional subsurface data were collected in the same general vicinity during the Phase I RFI. Groundwater data provide an indication of the groundwater quality at the site in 1994. A human health risk evaluation of the 1994 data determined that there were no potential unacceptable risks associated with groundwater at SWMU 75; however, given the data set was over 15 years old, additional groundwater samples were collected to reflect current site conditions. More recent groundwater samples were collected from the same monitoring wells. Therefore, groundwater data collected during the Site Characterization Report were not incorporated into the revised human health risk evaluation.

- **Phase I/II ECP** – Detected constituents in wipe samples collected as part of the ECP were evaluated qualitatively with the Phase I RFI perimeter soil samples to determine whether similar constituents from inside the building are found outside.

- **Phase I RFI** – Most of the data are usable, with only 4.7 percent of the total results "R" qualified as rejected. As noted in the Phase I RFI, 75SB03 was collected south of Building 896 and, therefore, better represents SWMU 74 conditions (Baker, 2011). However, as a conservative measure, its data were included in this 6-step decision process. Additionally, TPH is not typically a RCRA constituent, is not strictly risk-based, and SVOC and VOC data are available for soil collected as part of the RFI. Furthermore, TPH was not detected above the PREQB UST program screening level of 100 milligrams per kilogram (mg/kg) and was not detected in groundwater as part of the 1994 site characterization investigation efforts, or during the August 2012 groundwater investigation. Therefore, TPH was not considered further in the 6-step decision process.

- **Revised Phase I RFI** – Following receipt of the analytical data from the laboratory, the groundwater data were validated by a third-party data validation subcontractor. The data validation summary reports are provided in **Appendix B**. A data usability assessment of the validated data was performed to evaluate the overall measurement performance results (reliability) and their potential effects on data availability for decision making. The data as a whole are of good quality and usable for the purpose of evaluating releases as a result of SWMU 75 activities. All of the data are useable; none of the results were "R" qualified or rejected. As noted in the SAP (CH2M HILL, 2012), although monitoring well MW1 was unable to be located, potential releases associated with SWMU 75 are more than adequately represented by the remaining wells on site (MW2, MW3, MW4, and MW5).

Step 2 – Were any inorganics detected above the NAPR background screening values (Baker, 2010) or were any non-inorganics detected?

For soil and groundwater, consistent with the Phase I RFI, analytical data for inorganics were compared to the upper limit of the mean background (mean plus 2 standard deviations, referred to herein as the mean+2S), as presented in the *Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds* (Baker, 2010). The maximum background concentration was used when a mean+2S was not calculated for a specific analyte, noted as follows. Additionally, the maximum background concentrations were considered in Step 5. The analytical data summary from previous investigations is presented in **Tables 2-2 through 2-5,** and from the most recent investigation in **Table 5-1**.

- **Table 2-4** – Surface Soil: VOCs were not detected, 20 SVOCs were detected, and five inorganics were detected above background concentrations. Silver was not detected in background surface soil samples; therefore, the detections of silver at SWMU 75 (maximum estimated concentration of 0.41mg/kg) were conservatively considered exceedances of background. Thallium was detected in one background surface soil sample (at a concentration of 0.1 mg/kg); therefore, a mean+2S background value was not established for thallium. The detections of thallium in surface soil from SWMU 75 (maximum concentration of 0.14 mg/kg) above the detected concentration in background surface soil have been considered exceedances of background.

- **Tables 2-2 and 2-5** – Subsurface Soil: VOCs were not detected, 15 SVOCs were detected, and five inorganics were detected above background concentrations. Silver was detected in one background subsurface soil sample (at a concentration of 0.1 mg/kg); therefore, a mean+2S background value was not established for silver. The detections of silver in subsurface soil from SWMU 75 (maximum concentration of 1.9 mg/kg) above the detected concentration in background subsurface soil have been considered an exceedance of background. Thallium was not detected in the background subsurface soil samples; therefore, a mean+2S background value was not established for thallium. The detections of thallium in subsurface soil from SWMU 75 (maximum concentration of 0.13 mg/kg) have been considered exceedances of background.

- **Table 5-1 –** Groundwater: Previous groundwater data from 1994 identified PAHs and naphthalene detected in one well. Groundwater data were collected in August 2012 to represent current site conditions. Naphthalene was not detected in any of the groundwater samples collected in August 2012. Three SVOCs (acenaphthene,

fluoranthene, and pyrene) were detected in one well (803-MW03), none of which exceeded any of the screening criteria (**Figure 5-4**). Lead was not detected in any of the groundwater samples collected.

Step 3 – Are there any inorganic constituents above background or non-inorganic constituents that are potentially attributable to a historical RCRA release from SWMU 75?

- As previously noted, the relatively low concentrations of potential contaminants identified at the site suggest their presence may be associated with the site's industrial setting rather than a site-related release. However, based on the reported use of the site and the observations during the ECP, the PAHs and some metals (those above background) were conservatively assumed to be the potential result of historical RCRA-related releases and were considered further in the decision process. It is noted that bis(2-ethylhexyl)phthalate was detected in soil (also present in interior wipe samples); however, di-n-butylphthalate was not detected in building exterior samples.

- Of particular note, although considered further in the decision process, because they were detected above background, the site-wide arsenic concentrations may not be attributable to a release. A 2003 Agency for Toxic Substances and Disease Registry study indicated the presence of naturally occurring arsenic up to 22 mg/kg on the island of Puerto Rico (ATSDR, 2003). Another study at NAPR has indicated arsenic may be attributable to background at concentrations up to 4.3 mg/kg (AGVIQ/ CH2M HILL, 2011). Only one surface soil sample exceeded 4.3 mg/kg at SWMU 75 (13.3 mg/kg). This information suggests that arsenic concentrations in soil at SWMU 75 are likely wholly or primarily attributable to background.

Step 4 – Are there any exceedances (over that of background) of the most conservative screening values?

In this step of the decision analysis, non-inorganic constituents and inorganic constituents above the background values in groundwater and soil were compared to screening values. Groundwater data were compared to the PRWQS (PREQB, 2010), federal MCLs, and USEPA tap water Regional Screening Levels (RSLs). The soil data were compared to the USEPA residential and industrial soil RSLs and soil-to-groundwater soil screening levels (SSLs) at a dilution attenuation factor (DAF) of 1 (meaning there is no dilution attenuation and the concentration at the receptor point is the same as that in the soil leachate). Constituents with both MCL-based and risk-based SSLs were only compared to the risk-based SSL if an MCL-based MCL was not available. Surface soil samples were also compared to ecological screening values.

- Groundwater MCL/Puerto Rico Groundwater Quality Standards/Tap Water RSL Comparison:
  - **Table 5-1 –** Groundwater: No constituents exceeded background or other screening criteria in groundwater samples collected in August 2012 (**Figure 5-4**).
- Soil RSL and Ecological Screening Value Comparison:
  - **Table 2-4 –** Surface Soil: Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno (1,2,3-cd)pyrene were detected above the residential RSL. Of the constituents, only benzo(a)pyrene also exceeded the industrial RSL. Arsenic and thallium were the only inorganics detected above the maximum background values and the residential RSLs. Arsenic concentrations also exceeded the industrial RSLs. There were no constituents exceeding maximum background and ecological screening values; however, dibenzofuran was detected in surface soil, but there is no screening value so this constituent was considered further in Step 5.
  - **Tables 2-2 and 2-5 –** Subsurface Soil: Benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene were detected above the residential RSL. However, the concentrations of these SVOCs were below the industrial RSL. Arsenic was the only inorganic constituent detected above the maximum background value and the residential and industrial RSLs. Thallium, which does not have an established background value because it was not detected in the background samples, was detected in two subsurface soil samples above the residential RSL.

- Soil SSL Comparison – Several PAHs and lead were detected in the soil at concentrations that exceed the SSLs and background (**Tables 2-4 and 2-5**). However, lead was not detected in groundwater above its action level. Although arsenic, cadmium, and silver are present in the soil at concentrations that exceed the SSLs, no further consideration of these constituents was required based on the following lines of evidence:

  - Arsenic concentrations were consistent with background, as noted under Step 3.
  - Cadmium was detected slightly above maximum background in surface soil (0.92 mg/kg) from only one location (SB01), at a concentration (0.95 mg/kg) above the MCL-based soil-to-groundwater SSL at a DAF of 1 (0.38 mg/kg); however, the concentration was below mean +2S background (1.02 mg/kg). Cadmium was also detected just above maximum background (0.62 mg/kg) and mean +2S background (0.57 mg/kg) in subsurface soil from two locations (SB01 and SB02) at concentrations of 0.95 and 0.74 mg/kg, respectively, which are also above the MCL-based soil-to-groundwater SSL at a DAF of 1 (0.38 mg/kg) and the risk-based SSL at a DAF of 1 (0.52 mg/kg). Considering the site comprises of general fill (as discussed in Section 3), surface soil background concentrations are also appropriate for comparison purposes and concentrations of cadmium are below surface soil background levels. Additionally, cadmium is not commonly associated with the petroleum products likely used at SWMU 75.
  - Silver was not detected above any screening values in surface soil and was detected in subsurface soil above maximum background and the risk-based soil-to-groundwater SSLs at a DAF of 1 (0.6 mg/kg) at only one location (SB01, 1.9 mg/kg). Silver is not commonly associated with the petroleum products likely used at SWMU 75 and if there were a release or alternate contaminant source associated with silver, concentrations in surrounding soil samples would likely be higher.

Step 5 – Can more realistic evaluations of the data be performed, and if so, do they suggest that contaminant levels warrant no further investigation or action?

Human Health Evaluation

- Soil

  - As a conservative approach, risk estimates were prepared for a hypothetical future residential scenario at SWMU 75. SWMU 75 is less than 0.25 acre in size and the building is currently not used or in operation. No chemicals in soil were detected above both background (for inorganics) and adjusted RSLs at concentrations exceeding 100 times the screening levels (**Table 5-2**). Therefore, no hot spots were identified and all soil data were merged in the residential evaluation.
  - Two metals (arsenic and thallium) and five PAHs were detected in surface soil (0 to 1 foot bgs) or total soil (0 to 6 feet bgs) above both human health screening levels and background levels (metals only) (see **Tables 2-4 and 2-5**). An iterative approach was used where if the maximum detected concentration caused an exceedance of USEPA's acceptable risk levels, USEPA's ProUCL software was used to calculate the 95 percent upper confidence limit (UCL) on the mean concentration if more than eight analytical results were available for the chemical. If fewer than eight analytical results were available for the chemical, the maximum concentration was used.
  - Arsenic was detected in five of five surface soil samples and 10 of 10 total soil samples above its RSL (0.39 mg/kg). Based on the 95 percent UCL concentration (5.8 mg/kg), the excess lifetime cancer risk (ELCR) is 2×10^{-5} and the non-cancer hazard quotient (HQ) is 0.3, both of which are within USEPA's acceptable levels, so arsenic would not be identified as a risk driver.
  - Thallium was detected in two of five surface soil samples and four of 10 total soil samples above its adjusted RSL (0.078 mg/kg). Based on the maximum detected concentration (0.14 mg/kg), the HQ is 0.2, which is within USEPA's acceptable level, so thallium would not be identified as a risk driver.
  - Benzo(a)anthracene was detected in one of five surface soil samples and one of 10 total soil samples above its RSL (150 micrograms per kilogram [µg/kg]). Based on the 95 percent UCL concentration

(1 mg/kg), the ELCR is 7 x 10^{-6}, which is within USEPA's acceptable range, so benzo(a)anthracene would not be identified as a risk driver.

- Benzo(a)pyrene was detected in four of five surface soil samples and seven of 10 total soil samples above its RSL (15 µg/kg). Based on the 95 percent UCL concentration (0.5 mg/kg), the ELCR is 3 x 10^{-5}, which is within USEPA's acceptable range, so benzo(a)pyrene would not be identified as a risk driver.
- Benzo(b)fluoranthene was detected in two of five surface soil samples and three of 10 total soil samples above its RSL (150 µg/kg). Based on the 95 percent UCL concentration (0.5 mg/kg), the ELCR is 3 x 10^{-6}, which is within USEPA's acceptable range, so benzo(b)fluoranthene would not be identified as a risk driver.
- Dibenz(a,h)anthracene was detected in three of five surface soil samples and five of 10 total soil samples above its RSL (15 µg/kg). Based on the 95 percent UCL concentration (0.03 mg/kg), the ELCR is 2 x 10^{-6}, which is within USEPA's acceptable range, so dibenz(a,h)anthracene would not be identified as a risk driver.
- Indeno(1,2,3-cd)pyrene was detected in two of five surface soil samples and two of 10 total soil samples above its RSL (150 µg/kg). Based on the 95 percent UCL concentration (0.44 mg/kg), the ELCR is 3 x 10^{-6}, which is within the USEPA's acceptable range, so indeno(1,2,3-cd)pyrene would not be identified as a risk driver.

  Three additional constituents (chromium, cobalt, and vanadium) were detected in surface and total soil above adjusted human health screening levels but below background levels.

  Based on 95 percent UCL concentrations of arsenic, thallium, and the five PAHs, and maximum detected concentrations of the three additional constituents, the cumulative ELCR is 6 x 10^{-5} and the maximum target organ-specific hazard index (HI) is 0.6 (see **Table 5-2**); the cumulative ELCR and HI are within USEPA's acceptable levels. Consequently, there is not a concern for potential cumulative effects from multiple PAHs and metals in soil at SWMU 75.

- Groundwater
  - In August 2012, no chemicals were detected in groundwater at concentrations exceeding human health screening levels (**Table 5-1**). Based on the results of the August 2012 groundwater samples, there is no unacceptable risk associated with exposure to groundwater as a result of releases from SWMU 75.
- Ecological Evaluation
  - There are no complete and significant ecological exposure pathways at SWMU 75 based upon the very small size of the site (less than 0.25 acre) and the current (and anticipated future) industrial land use. However, for conservatism, data for surface soil samples (0 to 1 foot bgs) from the site were compared with ecological soil screening values for plants and soil invertebrates. Food web modeling was not conducted because of the small size of the site and lack of habitat.
  - No detected constituent exceeded both soil screening values and background (**Table 5-3**). Soil screening values were not available for dibenzofuran. This constituent does not pose an unacceptable risk to plants and soil invertebrates based on the following:
  - Dibenzofuran was detected in one of five surface soil samples, at a maximum concentration of 30.0 µg/kg (0.030 mg/kg). Although there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentration of dibenzofuran is too low to elicit adverse effects. In studies with oligochaete worms exposed to dibenzofuran-spiked soils, the resulting LC50 (survival) and EC50 (reproduction) values were 400 and 130 mg/kg, respectively (Sverdrup et al., 2002). In a similar study exposing collembolans (or springtails) to spiked soils, the LC50 and EC50 values were 50 and 23 mg/kg,

respectively, for dibenzofuran (Sverdrup et al., 2001). Maximum site surface soil concentrations for dibenzofuran were orders of magnitude below these effect concentrations.

Step 6 – Does the historical information and/or spatial distribution of data indicate the potential source area was sufficiently sampled?

Minor staining inside the building and data from wipe, surface soil, and subsurface soil samples collected from inside and around the building indicate that releases to environmental media may not have occurred (that is, are indistinguishable from what is expected in urban-like settings) or were relatively minor in that risk estimates associated with residential (unrestricted) exposure to soil are within USEPA-acceptable levels. The historical samples targeted areas representing the most likely areas where releases could have occurred and found little to no evidence of release. Therefore, existing soil data are sufficient in terms of spatial extent and analytical parameters to characterize the nature and extent of contamination and associated potential human health and ecological risks. Historical information and site-visit observations indicate that any interior releases not contained within the building could have been tracked outside by maintenance workers. Exterior releases would likely have been associated with the former UST and AST. Sample locations were biased to the vicinity of building doorways and the former UST and AST and collected at depths to best determine whether releases occurred. Continuous soil borings were advanced to groundwater during the site characterization (including the area around the former UST) and screened with an organic vapor analyzer, which did not detect any hydrocarbon vapors. Nonetheless, soil samples were collected in each boring to provide horizontal and vertical spatial characterization of the areas where releases could have occurred. Based on this information, the spatial distribution of soil samples indicates the potential source areas were sufficiently sampled.

The data (low concentrations) from wipe samples collected within the building suggest any interior releases were minor. Although it is possible that minor drips and spills within the pump house may have been transported to the subsurface concrete trough through the access doorway, they would have been washed away by the constant wave and tidal action of Ensenada Honda, as the trough terminates at the bulkhead and opens to Ensenada Honda. Additionally, the concrete trough is not a potential source of release to subsurface soil. The sediments along the shoreline of Ensenada Honda were investigated and closed out with NFA as part of AOC D, as noted in the RCRA Consent Order (USEPA, 2007). Therefore, no additional investigation of Ensenada Honda is warranted.

The spatial distribution of monitoring wells installed and sampled as part of the 1994 site characterization report for UST #803 would adequately capture potential releases from inside the building, as well as those associated with the former UST and AST (Blasland, Bouck & Lee, Inc., 1994). Sample analysis conducted in 1994 during the UST removal was focused on those constituents commonly attributable to fuel USTs ASTs (PAHs, lead, BTEX, methyl tert butyl ether, and TPH). Historical information suggests the wells provide appropriate spatial coverage of the site and the analytical parameters were appropriate for the potential contaminant sources present at the site. However, since the data collected in 1994 were more than 15 years old and may not adequately represent current groundwater conditions, additional groundwater samples were collected in August 2012, in accordance with the Final Revised Phase I RFI SAP (CH2M HILL, 2012). Therefore, existing groundwater data are sufficient in terms of spatial extent and analytical parameters to characterize the nature and extent of contamination and associated potential human health and ecological risks.

TABLE 5-1
Groundwater Sample Detections and Exceedances - August 2012
Amended Phase I RFI Report for *SWMU 75*
Naval Activity Puerto Rico
Ceiba, Puerto Rico

Station ID	**CLEAN NAPR Background Arithmetic Mean 2S GW**	**Federal MCLs**	**Class SG Standards**	**Class SB Standards**	**Adjusted Tap Water RSLs (November, 2012)**	NAPR-W75-MW02	NAPR-W75-MW03	NAPR-W75-MW04	NAPR-W75-MW05	
Sample ID						NAPR-W75-GW02-0812	NAPR-W75-GW03-0812	NAPR-W75-GW04-0812	NAPR-W75-GW05-0812	NAPR-W75-GW05P-0812
Sample Date						08/27/12	08/27/12	08/28/12	08/27/12	08/27/12
Chemical Name										
Semivolatile Organic Compounds (µg/l)										
Acenaphthene	--	--	670	990	40	0.097 U	0.5	0.096 U	0.094 U	0.096 U
Fluoranthene	--	--	130	140	63	0.097 UJ	1.5 J	0.096 UJ	0.094 UJ	0.096 UJ
Pyrene	--	--	830	4,000	8.7	0.097 U	1.4	0.096 U	0.094 U	0.096 U
Lead (Total and Dissolved) (µg/l)										
Not Detected										
Wet Chemistry										
Chloride (mg/l)	--	--	--	--	--	160	2,200	1,100	56	NA
Salinity (%) (pct)	--	--	--	--	--	0.082	0.37	0.21	0.044	NA
Total dissolved solids (TDS) (mg/l)	--	--	--	--	--	1,200	4,300	2,400	650	NA

Notes:

NA - Not analyzed
J - Estimated.
U - Nondetect or not detected at significantly greater than that in an associated blank.
UJ - Nondetect. Estimated reporting limit.
mg/l - Milligrams per liter
pct - Percent
µg/l - Micrograms per liter

TABLE 5-2
Human Health Risk Assessment COPC Summary Table - Residential
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico
Ceiba, Puerto Rico

Site: SWMU-75
Media: Surface Soil, Total Soil

Data Summary									Background Comparison		Screening Level (SL) Comparison						Exposure Point Concentrations (EPC)				Risk Estimates		
Exposure Point	CAS Number	Chemical (1)	Minimum Concentration Qualifier	Maximum Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Background Value (2)	Max Exceeds Background	Carcinogenic RSL ELCR=1.0E-6 (3)	Noncarcinogenic RSL HQ=1 (3)	Final Adjusted RSL (4)	Basis	Frequency of SL Exceedance (5)	Max Exceeds 100x SL (5)	EPC (6)	Statistic	Basis	Note	Target Organ	ELCR (8)	HQ (8)
Surface Soil	7440-38-2	Arsenic	1 J	3.9 J	mg/kg	75SB05	5 / 5	1.80E-01 - 2.00E-01	2.5	Yes	0.39	22	0.39	ca	5 / 5	No	--	--	--	(7)	--	--	--
	7440-47-3	Chromium	5.4	14.9	mg/kg	75SB04	5 / 5	1.60E-01 - 1.80E-01	47	No	--	120000	0.29	ca	5 / 5	No	--	--	--	(7)	--	--	--
	7440-48-4	Cobalt	1.4	13.2	mg/kg	75SB04	5 / 5	2.10E-02 - 2.40E-02	50.2	No	370	23	2.3	nc	3 / 5	No	--	--	--	(7)	--	--	--
	7440-28-0	Thallium	0.038 J	0.14 J	mg/kg	75SB01	5 / 5	1.80E-01 - 2.00E-01	0.1	Yes	--	0.78	0.078	nc	2 / 5	No	--	--	--	(7)	--	--	--
	7440-62-2	Vanadium	6.7 J	85.1 J	mg/kg	75SB04	5 / 5	2.80E-01 - 3.10E-01	230	No	--	390	39	nc	1 / 5	No	--	--	--	(7)	--	--	--
	56-55-3	Benzo(a)anthracene	0.031	1.3 J	mg/kg	75SB01	4 / 5	6.00E-04 - 3.70E-03	--	--	0.15	--	0.15	ca	1 / 5	No	--	--	--	(7)	--	--	--
	50-32-8	Benzo(a)pyrene	0.012	0.84	mg/kg	75SB01	5 / 5	4.00E-04 - 2.50E-03	--	--	0.015	--	0.015	ca	4 / 5	No	--	--	--	(7)	--	--	--
	205-99-2	Benzo(b)fluoranthene	0.0096 J	0.72	mg/kg	75SB01	5 / 5	6.00E-04 - 3.70E-03	--	--	0.15	--	0.15	ca	2 / 5	No	--	--	--	(7)	--	--	--
	53-70-3	Dibenz(a,h)anthracene	0.0034 J	0.06 J	mg/kg	75SB01	4 / 5	3.50E-04 - 4.00E-04	--	--	0.015	--	0.015	ca	3 / 5	No	--	--	--	(7)	--	--	--
	193-39-5	Indeno(1,2,3-cd)pyrene	0.016 J	0.69 J	mg/kg	75SB01	5 / 5	3.90E-04 - 2.40E-03	--	--	0.15	--	0.15	ca	2 / 5	No	--	--	--	(7)	--	--	--
Total Soil	7440-38-2	Arsenic	1 J	13.3 J	mg/kg	75SB04	10 / 10	1.80E-01 - 2.10E-01	3.4	Yes	0.39	22	0.39	ca	10 / 10	No	5.8	95% App. Gamma	UCL	(7)	Skin, Vascular	1.5E-05	0.3
	7440-47-3	Chromium	4.6	18.6	mg/kg	75SB04	10 / 10	1.60E-01 - 1.80E-01	52	No	--	120000	0.29	ca	10 / 10	No	19	--	Max	(7)	NOE	--	0.0002
	7440-48-4	Cobalt	1.4	13.2	mg/kg	75SB04	10 / 10	2.10E-02 - 2.40E-02	73.4	No	370	23	2.3	nc	6 / 10	No	13	--	Max	(7)	Thyroid	3.6E-08	0.6
	7440-28-0	Thallium	0.032 J	0.14 J	mg/kg	75SB01	10 / 10	1.80E-01 - 2.10E-01	0.1	Yes	--	0.78	0.078	nc	4 / 10	No	0.14	--	Max	(7)	Hair follicle atrophy	--	0.2
	7440-62-2	Vanadium	6.7 J	85.1 J	mg/kg	75SB04	10 / 10	2.80E-01 - 3.20E-01	232	No	--	390	39	nc	2 / 10	No	85	--	Max	(7)	Hair Cystine	--	0.2
	56-55-3	Benzo(a)anthracene	0.031	1.3 J	mg/kg	75SB01	7 / 10	6.00E-04 - 3.70E-03	--	--	0.15	--	0.15	ca	1 / 10	No	1.0	97.5% KM (Chebyshev)	UCL	(7)	NA	6.5E-06	--
	50-32-8	Benzo(a)pyrene	0.012	0.84	mg/kg	75SB01	9 / 10	4.00E-04 - 2.50E-03	--	--	0.015	--	0.015	ca	7 / 10	No	0.5	95% KM (Chebyshev)	UCL	(7)	NA	3.3E-05	--
	205-99-2	Benzo(b)fluoranthene	0.0096 J	0.72	mg/kg	75SB01	9 / 10	6.00E-04 - 3.70E-03	--	--	0.15	--	0.15	ca	3 / 10	No	0.5	95% KM (Chebyshev)	UCL	(7)	NA	3.1E-06	--
	53-70-3	Dibenz(a,h)anthracene	0.0034 J	0.06 J	mg/kg	75SB01	8 / 10	3.50E-04 - 4.10E-04	--	--	0.015	--	0.015	ca	5 / 10	No	0.03	95% KM (t)	UCL	(7)	NA	2.0E-06	--
	193-39-5	Indeno(1,2,3-cd)pyrene	0.016 J	0.69 J	mg/kg	75SB01	9 / 10	3.90E-04 - 2.40E-03	--	--	0.15	--	0.15	ca	2 / 10	No	0.44	95% KM (Chebyshev)	UCL	(7)	NA	2.9E-06	--

Note:

(1) Chemical whose maximum detected concentration (MaxDet) exceeds adjusted RSL in soil are presented on the table.

(2) Background Concentrations for NAPR are the maximum background concentrations for each soil grouping; background soil concentrations of fine sand/silt were used for total soil.

(3) Regional Screening Levels (RSL) (November 2012) based on an ELCR of $1x10^{-6}$ and an HQ=1.

- RSLs for residential soil are used for surface soil and total soil.

(4) The final RSL: the lower of carcinogenic RSLs based on ELCR of $1x10^{-6}$ and noncarcinogenic RSLs adjusted using HQ=0.1.

(5) The final RSL is used as Screening Level (SL).

(6) The MaxDet was initially used as exposure point concentration (EPC). When the risk estimates based on MaxDet exceeds ELCR of $1x10^{-6}$ and/or target organ-specific Hazard Index (HI) of 1, upper confidence limit (UCL) on mean is used as EPC for surface and total soil.

(7) The EPCs in total soil are used for the risk calculation.

(8) Noncarcinogenic hazard quotient and ELCR are estimated using the ratio of RSL and EPC.

- HQ = EPC / Noncarcinogenic RSL (based on HQ=1)
- ELCR = EPC x $1x10^{-6}$ / Carcinogenic RSL (based on ELCR=$1x10^{-6}$)

The expected form of chromium is Chromium (III). Therefore, the SL for 'Chromium (III)' was used as the Cancer and Noncancer Toxicity screening value.
The SL for 'Vanadium and Compounds' was used as the adjusted SL for Vanadium.

RSL Basis: ca = Carcinogenic; nc = Noncarcinogenic
J = compound was detected below the reporting limit in the sample
Target Organ: NOE = no observed effect

SWMU-75 Cumulative Risk	ELCR	Max HI *
Soil	6E-05	0.6
HI is based on effect on thyroid		

* Max HI is the highest HI associated with any target organ.

TABLE 5-3
Ecological Screening - SWMU 75 Surface Soils - Plants and Soil Invertebrate
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico
Ceiba, Puerto Rico

Chemical	Soil Screening Value	Maximum Background	75SB01 75SB01-00 03/29/10	75SB02 75SB02-00 03/29/10	75SB03 75SB03-00 03/29/10	75SB04 75SB04-00 03/29/10	75SB04 75SB04-00D 03/29/10	75SB05 75SB05-00 03/29/10
Volatile Organic Compounds (UG/KG)								
No Detections	--	--	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/KG)								
2-Methylnaphthalene	LMW PAH	--	9.00 U	9.90 U	9.00 U	NA	**0.72 J**	9.00 U
Acenaphthene	LMW PAH	--	**42.0**	9.90 U	9.00 U	NA	8.70 U	9.00 U
Acenaphthylene	LMW PAH	--	**12.0**	**2.60 J**	**68.0**	NA	**3.50 J**	**22.0**
Anthracene	LMW PAH	--	**570**	9.90 U	**72.0**	NA	**4.90 J**	**25.0**
Benzo(a)anthracene	HMW PAH	--	**1,300 J**	9.90 UJ	**95.0 J**	NA	**31.0**	**91.0 J**
Benzo(a)pyrene	HMW PAH	--	**840**	**12.0**	**130**	NA	**34.0 J**	**88.0**
Benzo(b)fluoranthene	HMW PAH	--	**720**	**9.60 J**	**260**	NA	**39.0 J**	**120 J**
Benzo(g,h,i)perylene	HMW PAH	--	**460**	**15.0 J**	**310**	NA	**31.0**	**56.0 J**
Benzo(k)fluoranthene	HMW PAH	--	**1,100 J**	**8.50 J**	**300**	NA	**47.0 J**	**110 J**
bis(2-Ethylhexyl)phthalate	30,000	--	**76.0 J**	200 U	**44.0 J**	**70.0 J**	**44.0 J**	**880**
Butylbenzylphthalate	30,000	--	**62.0 J**	200 U	180 U	180 U	180 U	180 U
Chrysene	HMW PAH	--	**940**	**6.60 J**	**88.0**	NA	**27.0 J**	**87.0**
Dibenz(a,h)anthracene	HMW PAH	--	**60.0 J**	**3.40 J**	**36.0 J**	NA	8.70 U	**16.0 J**
Dibenzofuran	NSV	--	**30.0 J**	200 U	180 U	180 U	180 U	180 U
Fluoranthene	LMW PAH	--	**2,300 J**	**10.0**	**85.0**	NA	**41.0 J**	**170**
Fluorene	LMW PAH	--	**37.0**	9.90 U	9.00 U	NA	8.70 U	9.00 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	**690 J**	**16.0 J**	**330 J**	NA	**30.0 J**	**80.0 J**
Naphthalene	LMW PAH	--	9.00 U	9.90 U	9.00 U	NA	**0.99 J**	9.00 U
PAH (HMW)	18,000	--	**7,910**	**81.0**	**1,626**	NA	**286**	**788**
PAH (LMW)	29,000	--	**4,718**	**142**	**346**	NA	**154**	**340**
Phenanthrene	LMW PAH	--	**1,700 J**	9.90 U	**13.0**	NA	**3.90 J**	**15.0**
Pyrene	HMW PAH	--	**1,800 J**	9.90 U	**77.0**	NA	**43.0 J**	**140**
Herbicides (UG/KG)								
No Detections	--	--	NA	NA	NA	NA	NA	NA
Explosives (UG/KG)								
No Detections	--	--	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)								
Arsenic	18.0	2.50	**1.40 J**	**2.80 J**	**2.40 J**	**1.00 J**	0.52 UJ	**3.90 J**
Barium	330	220	**16.1**	**11.2**	**23.8**	**86.5**	**101**	**52.8**
Beryllium	40.0	0.58	0.54 U	0.58 U	0.52 U	**0.11 J**	**0.12 J**	**0.08 J**
Cadmium	32.0	0.92	**0.95**	**0.09 J**	**0.37 J**	**0.27 J**	**0.22 J**	**0.20 J**
Chromium	64.0	47.0	**9.70**	**5.40**	**12.1**	**14.0**	**14.9**	**9.10**
Cobalt	13.0	50.2	**1.70**	**1.40**	**2.50**	**11.4**	**13.2**	**3.70**
Copper	70.0	180	**23.0**	**6.50**	**22.2**	**74.3**	**90.9**	**19.5**
Lead	120	21.0	**45.9**	**1.50**	**37.0**	6.60 R	1.90 R	**9.80**
Mercury	0.10	0.12	**0.02 J**	0.04 U	0.04 U	**0.01 J**	0.04 U	**0.01 J**
Nickel	38.0	19.0	**5.90**	**4.90**	**5.70**	**7.70**	**7.40**	**6.30**
Selenium	0.52	1.20	**0.33 J**	**0.45 J**	**0.31 J**	**0.37 J**	**0.27 J**	**0.46 J**
Silver	560	--	**0.41 J**	**0.06 J**	**0.09 J**	**0.10 J**	**0.10 J**	**0.10 J**
Thallium	1.00	0.10	**0.14 J**	**0.04 J**	**0.04 J**	**0.10 J**	**0.10 J**	**0.06 J**
Vanadium	130	230	**11.9 J**	**6.70 J**	**20.1 J**	**81.2 J**	**85.1 J**	**25.6 J**
Zinc	120	120	**84.3**	**6.90**	**22.5**	**61.6**	**61.4**	**30.6**
Total Petroleum Hydrocarbons (UG/KG)								
TPH-diesel range	NSV	--	11,000 U	12,000 U	**30,000**	11,000 U	**12,000**	11,000 U

Notes:

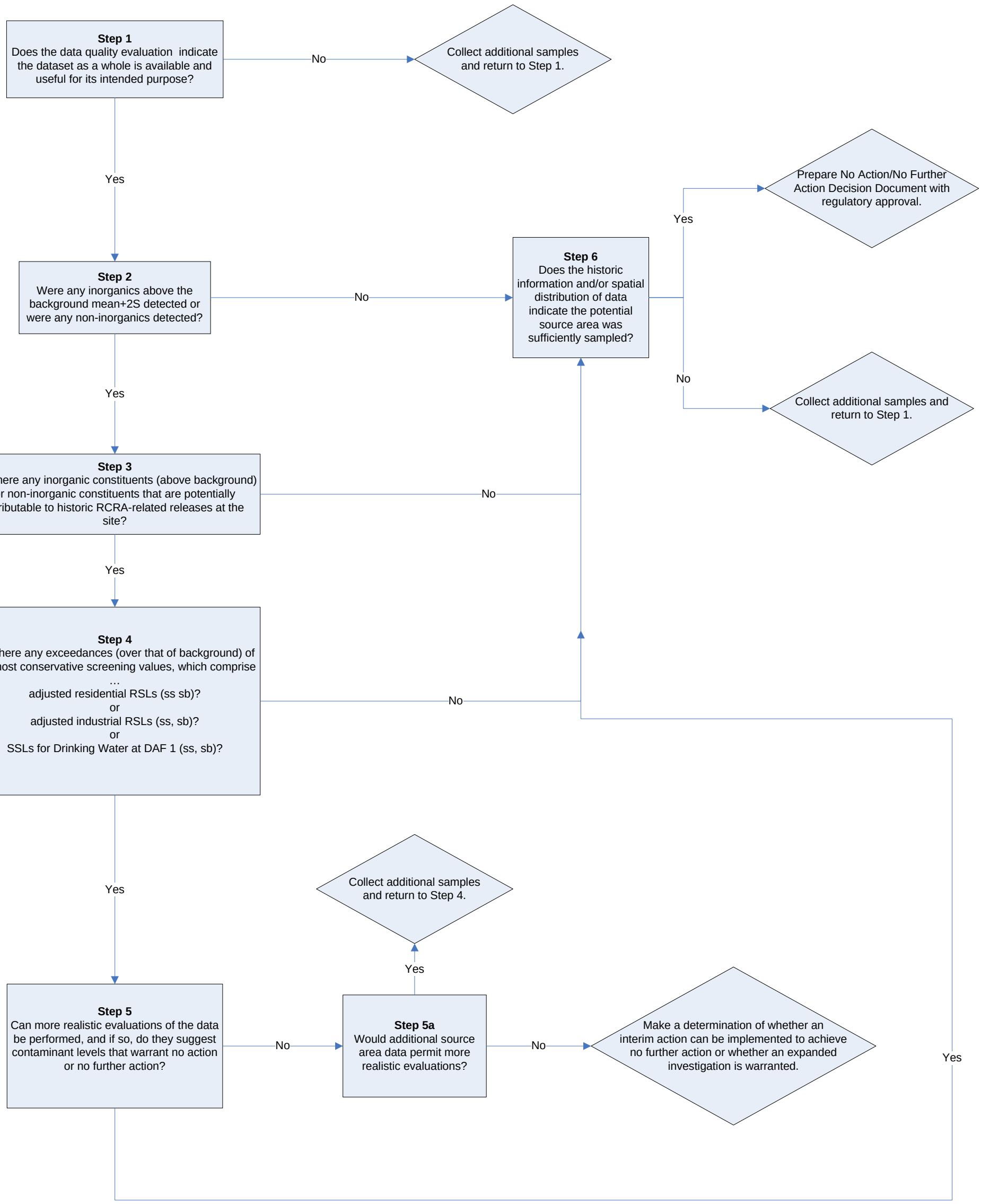
Grey highlighting indicates value greater than screening value or detect and no screening value (NSV)

Yellow highlighting indicates value equal to screening value

Red highlighting indicates value greater than or equal to screening value and exceeds background

Bold indicates detections

NA - Not applicable



Notes:
The decision makers associated with this decision tree are the Navy, USEPA, and PREQB.
ss = surface soil; sb = subsurface soil; sd = sediment; gw = groundwater

FIGURE 5-1
Data Evaluation 6-Step Decision Process
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background Maximum Background - Surface Soil	CLEAN NAPR Mean +2S Background - Surface Soil	RSLs Industrial Soil Adjusted	RSLs Residential Soil Adjusted	CLEAN RSLs MCL-Based SSLs at DAF 1	CLEAN RSLs Risk-Based SSLs at DAF 1	Eco Soil Screening Value
Sample ID							
Sample Date							
Semivolatile Organic Compounds (UG/KG)							
Benzo(a)anthracene	--	--	2,100	150	--	10	PAH (HMW)
Benzo(a)pyrene	--	--	210	15	240	3.5	PAH (HMW)
Benzo(b)fluoranthene	--	--	2,100	150	--	35	PAH (HMW)
Benzo(k)fluoranthene	--	--	21,000	1,500	--	350	PAH (HMW)
Dibenz(a,h)anthracene	--	--	210	15	--	11	PAH (HMW)
Indeno(1,2,3-cd)pyrene	--	--	2,100	150	--	120	PAH (HMW)
Naphthalene	--	--	18,000	3,600	--	0.47	PAH (LMW)
Total Metals (MG/KG)							
Arsenic	2.5	2.65	1.6	0.39	0.29	0.0013	18.0
Cadmium	0.92	1.02	80	7.0	0.38	0.52	32.0
Lead	21	22	800	400	14	--	120
Thallium	0.1	--	1.0	0.078	0.14	0.011	1.00

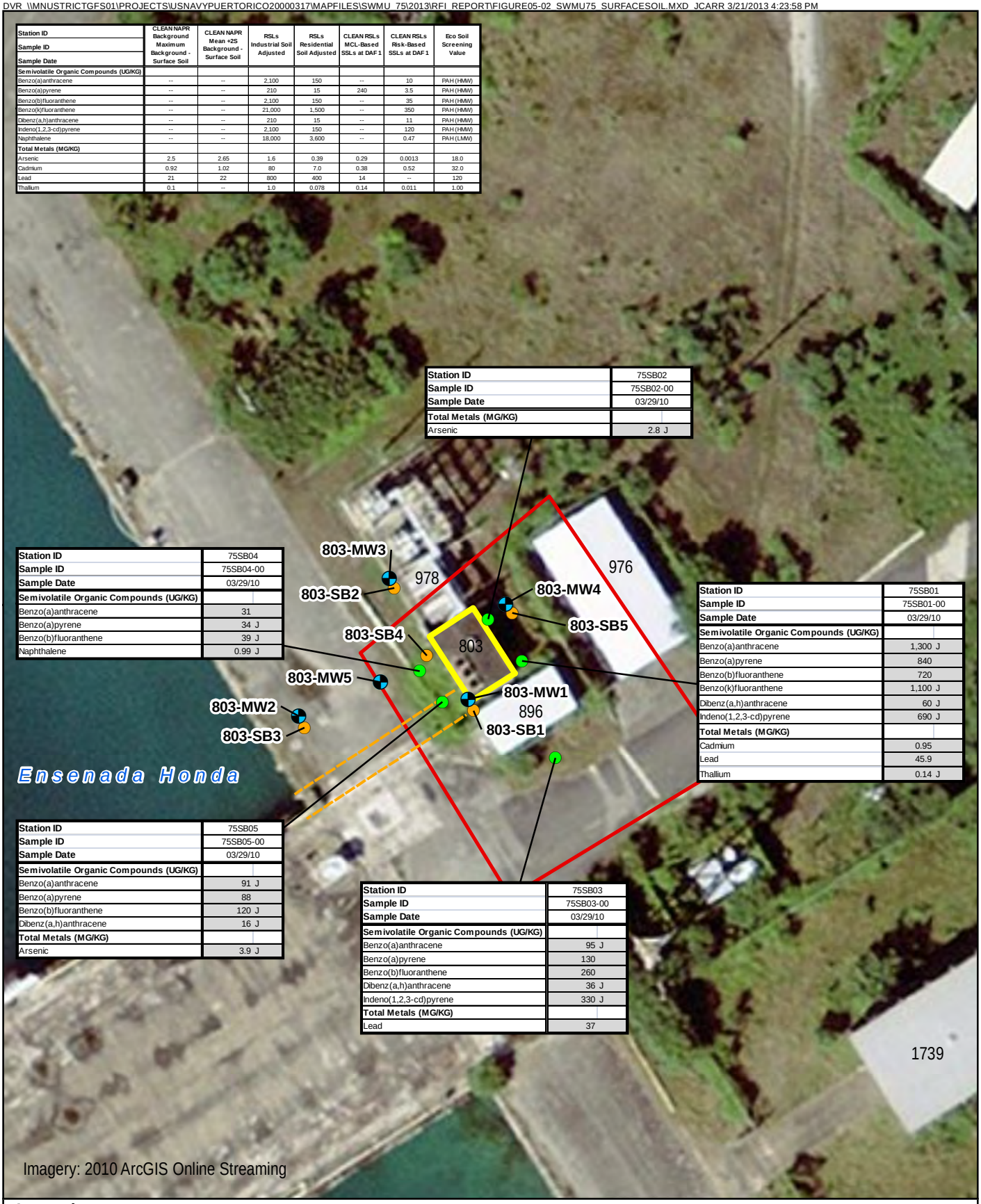
Station ID	75SB02
Sample ID	75SB02-00
Sample Date	03/29/10
Total Metals (MG/KG)	
Arsenic	2.8 J

Station ID	75SB04
Sample ID	75SB04-00
Sample Date	03/29/10
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	31
Benzo(a)pyrene	34 J
Benzo(b)fluoranthene	39 J
Naphthalene	0.99 J

Station ID	75SB01
Sample ID	75SB01-00
Sample Date	03/29/10
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	1,300 J
Benzo(a)pyrene	840
Benzo(b)fluoranthene	720
Benzo(k)fluoranthene	1,100 J
Dibenz(a,h)anthracene	60 J
Indeno(1,2,3-cd)pyrene	690 J
Total Metals (MG/KG)	
Cadmium	0.95
Lead	45.9
Thallium	0.14 J

Station ID	75SB05
Sample ID	75SB05-00
Sample Date	03/29/10
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	91 J
Benzo(a)pyrene	88
Benzo(b)fluoranthene	120 J
Dibenz(a,h)anthracene	16 J
Total Metals (MG/KG)	
Arsenic	3.9 J

Station ID	75SB03
Sample ID	75SB03-00
Sample Date	03/29/10
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	95 J
Benzo(a)pyrene	130
Benzo(b)fluoranthene	260
Dibenz(a,h)anthracene	36 J
Indeno(1,2,3-cd)pyrene	330 J
Total Metals (MG/KG)	
Lead	37



Legend

- Monitoring Well Location
- Soil Boring Location (2010) (Surface and Subsurface Soil Samples)
- Soil Boring Location (1994) (Subsurface Soil Samples)
- Underground Concrete Trench (Ocean Water Conduit)
- Building 803, Four Interior Wipe Samples (2004)
- SWMU 75 Boundary

N W E S

0 25 50 Feet

1 inch = 50 feet

Figure 5-2
Surface Soil Locations & Exceedances
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico

CH2MHILL

Station ID / Sample ID / Sample Date	CLEAN NAPR Maximum Background - Sand/Silt Subsurface Soil	CLEAN NAPR Mean +2S Background - Sand/Silt Subsurface Soil	RSLs Industrial Soil Adjusted	RSLs Residential Soil Adjusted	RSLs MCL-Based SSLs at DAF 1	RSLs Risk-Based SSLs at DAF 1
Semivolatile Organic Compounds (UG/KG)						
Benzo(a)anthracene	--	--	2,100	150	--	10
Benzo(a)pyrene	--	--	210	15	240	3.5
Benzo(b)fluoranthene	--	--	2,100	150	--	35
bis(2-Ethylhexyl)phthalate	--	--	120,000	35,000	1,400	17
Dibenz(a,h)anthracene	--	--	210	15	--	11
Total Metals (MG/KG)						
Arsenic	3.4	6.6	1.6	0.39	0.29	0.0013
Cadmium	0.62	0.57	80	7.0	0.38	0.52
Lead	7.8	6.2	800	400	14	--
Silver	0.1	--	510	39	--	0.6
Thallium	--	--	1.0	0.078	0.14	0.011

Station ID	75SB02
Sample ID	75SB02-01
Sample Date	03/29/10
Sample Depth	1 to 3 ft bgs
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	71 J
Benzo(a)pyrene	47
Benzo(b)fluoranthene	37 J
Total Metals (MG/KG)	
Cadmium	0.74
Lead	22.3

Station ID	75SB02
Sample ID	75SB02-04
Sample Date	03/29/10
Sample Depth	7 to 9 ft bgs
No Exceedances	

Station ID	75SB04
Sample ID	75SB04-01
Sample Date	03/29/10
Sample Depth	1 to 3 ft bgs
Semivolatile Organic Compounds (UG/KG)	
bis(2-Ethylhexyl)phthalate	42 J
Total Metals (MG/KG)	
Arsenic	13.3 J
Thallium	0.13 J

Station ID	75SB04
Sample ID	75SB04-04
Sample Date	03/29/10
Sample Depth	7 to 9 ft bgs
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	20 J
Benzo(a)pyrene	45

Station ID	75SB01
Sample ID	75SB01-01
Sample Date	03/29/10
Sample Depth	1 to 3 ft bgs
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	120 J
Benzo(a)pyrene	200 J
Benzo(b)fluoranthene	260 J
Dibenz(a,h)anthracene	30 J
Total Metals (MG/KG)	
Cadmium	0.95
Lead	76.6
Silver	1.9
Thallium	0.079 J

Station ID	75SB01
Sample ID	75SB01-04
Sample Date	03/29/10
Sample Depth	7 to 9 ft bgs
Semivolatile Organic Compounds (UG/KG)	
bis(2-Ethylhexyl)phthalate	75 J

Station ID	75SB05
Sample ID	75SB05-01
Sample Date	03/29/10
Sample Depth	1 to 3 ft bgs
Semivolatile Organic Compounds (UG/KG)	
Benzo(a)anthracene	68 J
Benzo(a)pyrene	83
Benzo(b)fluoranthene	41 J
bis(2-Ethylhexyl)phthalate	77 J
Dibenz(a,h)anthracene	16 J

Station ID	75SB03
Sample ID	75SB03-01
Sample Date	03/29/10
Sample Depth	1 to 3 ft bgs
Total Metals (MG/KG)	
Silver	0.11 J

Station ID	75SB03
Sample ID	75SB03-04
Sample Date	03/29/10
Sample Depth	7 to 9 ft bgs
Total Metals (MG/KG)	
Arsenic	4.2 J

803-MW3
803-SB2
803-MW4
803-SB5
803-SB4
803-MW5
803-MW1
803-MW2
803-SB3
803-SB1
978
976
803
896
1739
Ensenada Honda

Imagery: 2010 ArcGIS Online Streaming

Legend

- Monitoring Well Location
- Soil Boring Location (2010) (Surface and Subsurface Soil Samples)
- Soil Boring Location (1994) (Subsurface Soil Samples)
- Underground Concrete Trench (Ocean Water Conduit)
- Building 803, Four Interior Wipe Samples (2004)
- SWMU 75 Boundary

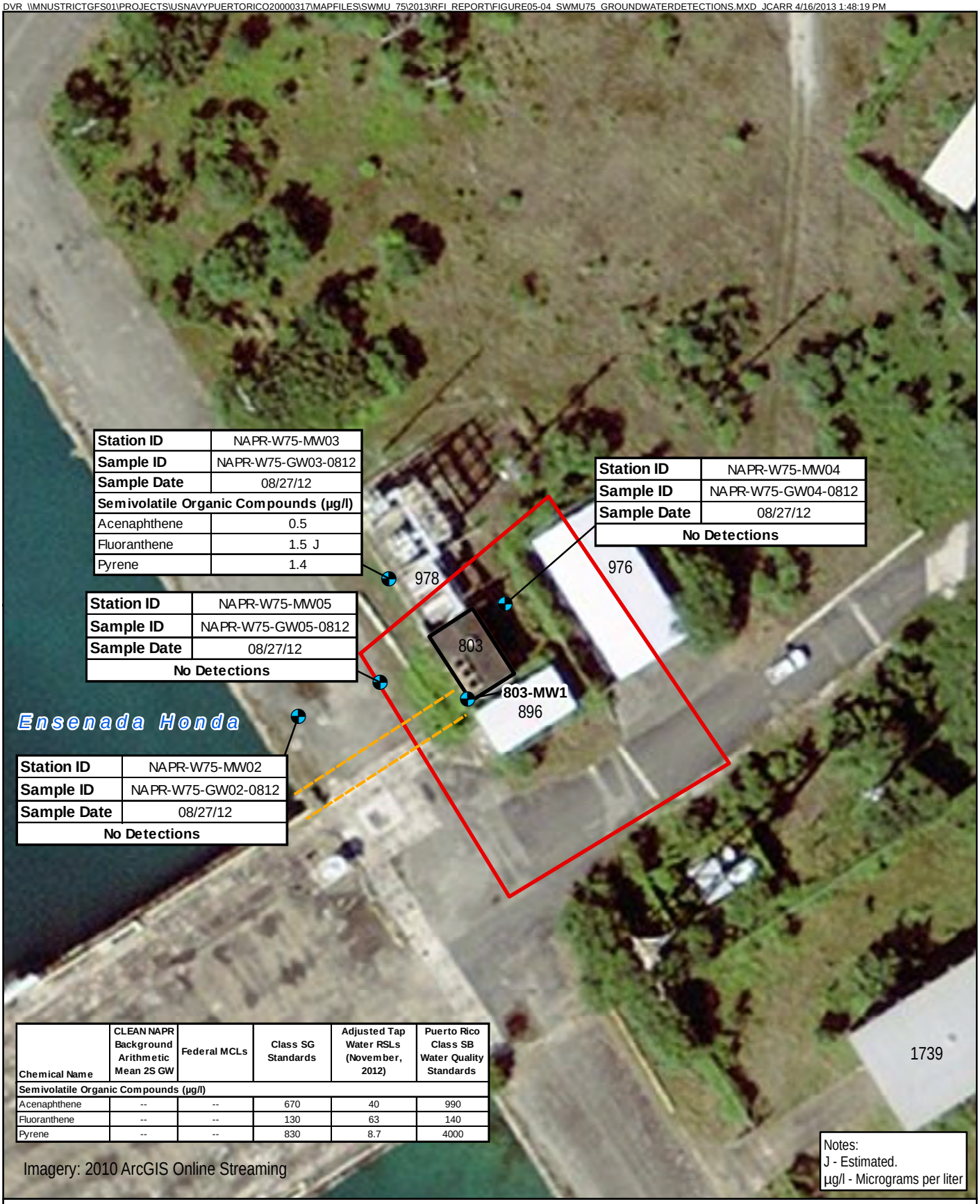
N W E S

0 25 50 Feet

1 inch = 50 feet

Figure 5-3
Subsurface Soil Locations & Exceedances
Amended Phase I RFI for SWMU 75 Naval Activity Puerto Rico

CH2MHILL



Legend

- Monitoring Well Location
- Underground Concrete Trench (Ocean Water Conduit)
- Building 803
- SWMU 75 Boundary

N
W E
S

0 50 100 Feet

1 inch = 50 feet

Figure 5-4
Groundwater Sample Locations and Detections-August 2012
Amended Phase I RFI for SWMU 75
Naval Activity Puerto Rico

CH2MHILL

SECTION 6

Conclusions and Recommendations

6.1 Conclusions

A human health risk evaluation and ecological risk evaluation were performed for the data collected in 1994, 2004, and 2010 at SWMU 75. Although the site is classified as industrial and is anticipated to remain the same in the future, to be conservative, a potential residential scenario was evaluated in the human health risk evaluation of soil and groundwater at SWMU 75. Even though no complete and significant ecological exposure pathways exist at SWMU 75, data from surface soil samples (0 to 1 foot bgs) from the site were compared to ecological soil screening values for plants and soil invertebrates and background for conservatism. Food web modeling was not conducted due to the small size of the site and lack of habitat (industrial nature of the site). The details of these evaluations are summarized in the media subsections that follow.

Soil

For soil, a human health risk evaluation was completed for a hypothetical future residential scenario. The human health evaluation determined that the cumulative ELCR and HI for soil are within the USEPA's acceptable levels, and therefore there are no unacceptable risks for potential human receptors exposed to soil at SWMU 75. With respect to potential ecological receptors, no detected constituents exceeded both soil screening values and background, and therefore the ecological risk evaluation determined that there are no unacceptable risks for plants and soil invertebrates.

Surface Water and Sediment

The surface water and sediment along the shoreline of Ensenada Honda were not investigated in any of the previous studies conducted in 1994, 2004, or 2010 as they had been investigated under a separate study and closed out with NFA as part of AOC D, as noted in the RCRA Consent Order (USEPA, 2007). Therefore, no additional investigation of Ensenada Honda was determined to be warranted (CH2M HILL, 2012).

Groundwater

A human health risk evaluation for groundwater at SWMU 75 was performed using the data collected in 1994. For groundwater, naphthalene was the only chemical previously detected in groundwater samples above its human health screening level and was the only risk driver identified for groundwater at SWMU 75. However, the data used for this evaluation were determined to be too old to represent current groundwater conditions, which is the basis for the supplemental groundwater investigation. Groundwater samples were collected in August 2012 to represent current groundwater conditions. The results of the August 2012 groundwater samples indicated that there are no exceedances of screening criteria or other potentially relevant criteria associated with groundwater at SWMU 75, and therefore no potential unacceptable risks are present from potential exposure to groundwater at SWMU 75.

6.2 Summary and Recommendation

Based on the results of all investigations and the 6-step evaluation, including risk evaluations for soil and groundwater at SWMU 75, no further investigation or corrective action is warranted. Potential human health and ecological risks associated with exposure to site soil and groundwater are within USEPA-acceptable levels, and there are no exceedances of any other potentially relevant criteria (e.g., MCLs). Potential human health and ecological risks associated with exposure to surface water and sediment in the nearby Ensenada Honda were previously evaluated and closed out with an NFA determination as part of the AOC D investigation (USEPA, 2007). Therefore, an NFA determination and removal of LUCs is recommended for all media (soil, groundwater, surface water, and sediment) associated with SWMU 75 as there are no potentially unacceptable risks associated with unrestricted land use and exposure.

SECTION 7

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Sverdrup, L.E., J. Jensen, A.E. Kelley, P.H. Krogh, and J. Stenersen. 2002. Effects of eight polycyclic aromatic compounds on the survival and reproduction of Enchytraeus crypticus (Oligochaeta, Clitellata). Environmental Toxicology and Chemistry. 21:109-114.

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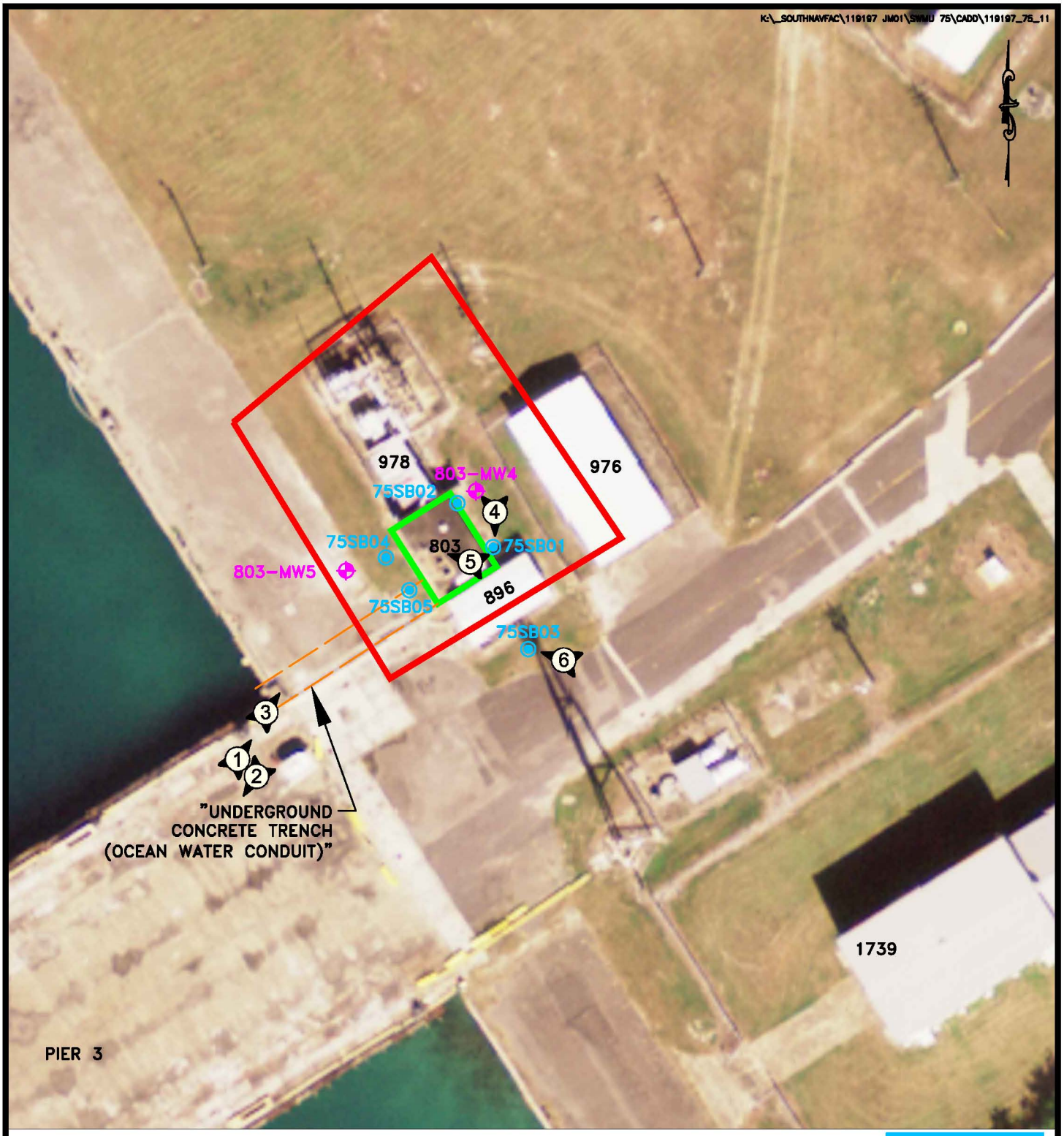
Appendix A
Field Investigation Information

SITE PHOTOGRAPHS



50 0 25 50

1 inch = 50 ft.

Baker

LEGEND

- SWMU BOUNDARY
- CONCRETE TRENCH
- BUILDING 803, FOUR INTERIOR WIPE SAMPLES WERE TAKEN (PHASE II ECP 2004)
- EXISTING MONITORING WELL LOCATION (SITE CHARATERIZATION SITE 803, 1994)
- 2010 PHASE I RFI SOIL BORING LOCATION
- PHOTO LOCATION AND DIRECTION

803 – BUILDING NUMBER

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

PHOTO LOCATION MAP
SWMU 75-BUILDING 803
PHASE I RFI REPORT

NAVAL ACTIVITY PUERTO RICO

Photo 1. In background - from left to right: Building 978 (and power station), Building 803 (SWMU 75), and Building 896 on the right – view looking northeast

Photo 2. Pier 3 and the Ensenada Honda – view looking southwest

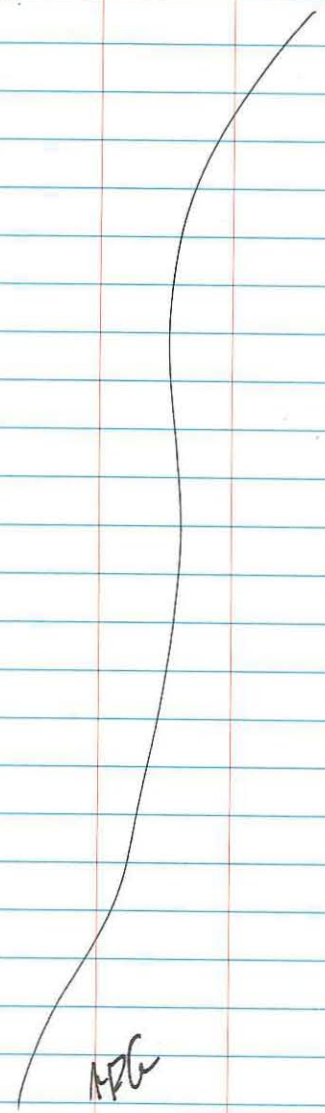
Photo 3. Opening to underground concrete trench ("Ocean Water Conduit")
View looking northeast

Photo 4. Boring advancement at 75SB02 - view looking south

Photo 5. Fire deluge and pump equipment inside Building 803

Photo 6. Soil boring advancement at 75SB03 - south side of Building 896
View looking west

FIELD LOG BOOK NOTES



81

MonDAY March 29, 2010

0645 - Arrive at NAPR - prep for Swmu 75 Soil Boring advancement.

0825 - Depart Security and arrive at Swmu 75.

0850 - Collect 75FB01

0900 - Collect 75ER01 - by ~~Rinsing~~ DI water through an un-used Macro Core Liner.

0905 - Drillers arrive on-site.

0930 - Assist with ~~Drilling~~ Soil Sampling (See R. Rosellus logbook for addl info.)

1220 - Depart Swmu 75 to Security Bldg. Pack and Prep Samples for Fedex for Swmu 67.

Weather Conditions:
Sunny + Warm 84° F.

82

1401 DEVELOP 67GW03 - TD 17.82' TOC
SWL 11.20 → 6.62
APPROX STICKUP 2.6' ∴ 4.1
BOTTOM SOFT & SOMPY SIMILAR TO 67GW08
SURGE/BAIL 10+ GAL OVER 40+ MIN.

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

1615 DEPART NOPR.

SUN. (3/28/10) B.2

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

- @ CONDO: SWIMMS KICKOFF, WP, CREATE LOGGERS (COMPUCHEM DID NOT PROVIDE.

MON (3/29/10

0645 ONSITE, PREP FOR SEDIMENTS SAMPLING, ORG OFFICE/TRUCK
0740 CALIBRATE PID to 103ppm.
0850 COLLECT 75FB01
0900 COLLECT 75ER01 FROM NEW DPT LINER. (SEE GEOLOGY LOG).
— AWAITING ARRIVAL OF DRILLERS.
0902 DRILLERS ARRIVE. HEAD TO 75
0920 CONDUCT 75 KICKOFF & H&S MEETING
— UTILITIES CLEARED BY MARK KIMBER
0930 BEGIN

— 75SB03 — (PID BKG 0.0)

0-4 0-0.2 TOPSOIL
3.2 0.2-4.0 FILL - ~~FINE~~ SILT to MED SAND, ~~SH~~ (BEACH SAND), LITTLE SHELLS., WHITISH/LT TAN, DRY to DAMP, NON PLASTIC, LOOSE (FILL?)
BKGD
75SB03-00 @0935
75SB03-01 @0940

4-8 4.0-8.0 SAA, DAMP.
2.9
BKGD
75SB03-04 @0950

75SB03 (CONT)

8-12 8.0-12.0 SAA. & MOIST,
3.2 WET/SATURATED @ 10' bgs.
BKGD

— 75SB05 — (PID BKG 0.0)

0-4 0.0-0.1 TOPSOIL (LITTLE)
2.2 0.1-3.9 (SAME @ 75SB03 - BROKEN SHELLS. LITTLE SHELLS.) A
BKGD
75SB05-00 @1000 3.9-4.0 CONCRETE W/ NOSE/REFUSAL (LIKELY THE WATER TROUGH?) TERMINATE BORING
75SB05-01 @1005

CONSTRUCTION FEATURE

— 75SB04 — (PID BKG 0.0)

0-4 ~~0-1.8 FILL~~ AC
2.6 0.0-0.2 TOPSOIL
BKGD 0.2-1.3 FILL. SILT to GRAVEL, SOME CLAY, BROWN, LT GREY GRAVEL, DRY to DAMP, NON PLASTIC, LOOSE.
75SB04-00 +DUP @1015 1.3-4.0 FILL. BROKEN SHELLS & SAND AS SB03 & SB05.
75SB04-01 +MS/MSD @1025 } MS + MSD (DOUBLE VOL) FOR VOCS
MS/MSD (SMALL) FOR OTHERS

755B04 (CONT)

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

755B04-04
@1040

8-12 SAA, WET SATURATED (VERY
1.2 LITTLE RECOVERY)
BKGD.

—755B02— (PID BKG 0.0)

0-4 STET
2.5
BKG

755B02-00
@1115

755B02-01
@1120.

→ 0.0 - 0.2 FILL SILT to GRAVEL, BR, LT GRAY GRAVEL, DRY, NON PLASTIC, LOOSE
0.2-4.0 BEACH SAND AS OTHERS

755B02 (CONT)

~~8-12~~

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

755B02-04
@1125

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

—755B01— (PID BKG 0.0)

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

755B01-00
@1140

755B01-01
+ DUP
@1145

755801 (CONT.)

4-8 FILL - BEACH SAND (SAME AS OTHERS) & GUBBLES -, DUMP
2.9
BKG

755801-04
@ 1145 PUR
1155

8-12 BEACH SAND, WET/SATURATED
2.1
BKG

1200 DRILLER GROUTING SBs,

— MANAGE SAMPLES
~~GW~~ SWLS @ LANDFILL
PREP/ORG - (SEE GAILEY LOG)

1645 DEPART NAPR

WORK @ CONDO - G7/75 SB/MW
SUM TBLS.

TUES (3/30/10)

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

~~KG-1030~~ PUR

0900 PREP to SAMPLE/PURGE (LOW FLOW) 67GW03
(SEE GW SAMPLING LOGS)

1005 COLLECT G7ER08 FROM ~~&~~ NEW
SPOON (SEE GAILEY LOG FOR SURFACE
SOIL SAMPLING DETAILS)

1030 COLLECT G7GW03 (SEE SAMPLING
LOGS)

- COLLECT IDW SAMPLES (SEE GAILEY
LOG)
- PREP/PACK/MANAGE/SHIP SUMMUS G7/75
SAMPLES.

1445 DEPART NAPR
GW SAMPLE LOGS/DRILLING LOGS
@ CONDO.

PUR SAM
- 1005 ~~GROB~~
- 1030 GWOR

WED (3/31/10)

0645 ONSITE, PREP/ORG/PACK EQUIP.

– @ 75 TRY TO REMOVE FLUSHMNT. MARK. BOZIVICH / TD 14.38' TOC

0830 75-N 8.21' TOC

0832 75-S 8.33' TOC

(AS SWN. 3/29) TD 15.1' TOC

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

1000 COMPLETE GPS / EVAL OF SWMN 59

CONSIDERATIONS – • CONCRETE
• FLUSH MOUNTS
• CLEARING (BUT NOT RIGHT WAY)
• UTILITIES. (FIRE HYDRANTS FINAL ELING)
• WIPS/CHIP.
• 57GW02 CONFLICTS W/ MAPPING.

1020 @ SWMN 67 FOR SWLS.

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

1055 ARRIVE @ SWMN 61 FOR SWLS

SEE PAGE 71 – SURVEYORS ONSITE

– CLEAN/ORG/SNIP EQUIP/INVENTORY VEHICLE.

1145 DEPART NAAR.

@ CAMOD – SWMN 59 SCHEDULE/LOGISTICS/AIRFARE/LODGING/PLANNING

SOIL BORING LOGS

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75
PROJ. NO.: 119197, 6.8 BORING NO.: 75SB01
COORDINATES: EAST: 939608.8033 NORTH: 798978.7114
ELEVATION: SURFACE: 110.0

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	--	--	3/29/2010	0.0 - 12.0	sunny, mid+ 80s	
Length	4'	--	--	--				
Type	Acetate	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

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

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
1					75SB01-00		SILT and FINE SAND, some beach sand, brown; dry to damp; non plastic; loose (fill) 0.4	109.6
2		D-1	1.9 48%		75SB01-01 + duplicate	BKG	SILT to MEDIUM SAND (beach sand), little shells; whitish, light tan; dry to damp; non plastic; loose (fill)	
3								
4	4.0							
5							same as above and damp	
6		D-2	2.9 73%			BKG		
7								
8	8.0				75SB01-04			
9							same as above and wet/saturated	
10		D-3	2.1 53%			BKG		

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 75SB01 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75

SO NO.: 119197, 6.8 BORING NO.: 75SB01

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
11							Continued from Sheet 1 11.0	99.0
		D-3	2.1			BKG	grades to gray and olive, med plasticity, stiff	
12	12.0		53%					98.0
13							End of Boring at 12.0'	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

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

DRILLER: William Rodrigez BORING NO.: 75SB01 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75
PROJ. NO.: 119197, 6.8 BORING NO.: 75SB02
COORDINATES: EAST: 939596.0610 NORTH: 798994.2823
ELEVATION: SURFACE: 110.2

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	--	--	3/29/2010	0.0 - 12.0	sunny, mid+ 80s	
Length	4'	--	--	--				
Type	Acetate	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

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

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
1					75SB02-00		SILT to GRAVEL, some clay; brown; dry to damp; non plastic loose (fill) 0.2	110.0
2		D-1	2.5 63%		75SB02-01	BKG	SILT to MEDIUM SAND (beach sand), little shells; whitish, light tan; dry to damp; non plastic; loose (fill)	
3								
4	4.0							
5							same as above and damp	
6		D-2	2.6 65%			BKG		
7								
8	8.0				75SB02-04			
9							same as above and wet/saturated (very little recovery)	
10		D-3	2.4 60%			BKG		

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 75SB02 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75

SO NO.: 119197, 6.8 BORING NO.: 75SB02

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
11		D-3	2.4			BKG	Continued from Sheet 1	
12	12.0		60%					98.2
13							End of Boring at 12.0'	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

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

DRILLER: William Rodrigez BORING NO.: 75SB02 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75
PROJ. NO.: 119197, 6.8 BORING NO.: 75SB03
COORDINATES: EAST: 939621.3314 NORTH: 798942.2900
ELEVATION SURFACE: 110.0

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	--	--	3/29/2010	0.0 - 12.0	sunny, mid+ 80s	
Length	4'	--	--	--				
Type	Acetate	--	--	--				
Hammer Wt	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

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

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
1					75SB03-00		TOPSOIL (organics) 0.2	109.8
2		D-1	3.2 80%		75SB03-01	BKG	SILT to MEDIUM SAND (beach sand), little shells; whitish, light tan; dry to damp; non plastic; loose (fill)	
3								
4	4.0							
5							same as above and damp	
6		D-2	2.9 73%			BKG		
7								
8	8.0				75SB03-04			
9							same as above and moist	
10		D-3	3.2 80%			BKG		
							wet/saturated at 10.0'	

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 75SB03 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75

SO NO.: 119197, 6.8 BORING NO.: 75SB03

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
11		D-3	3.2			BKG	Continued from Sheet 1	
12	12.0		80%					98.0
13							End of Boring at 12.0'	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

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

DRILLER: William Rodrigez BORING NO.: 75SB03 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75
PROJ. NO.: 119197, 6.8 BORING NO.: 75SB04
COORDINATES: EAST: 939570.4991 NORTH: 798974.9104
ELEVATION: SURFACE: 110.4

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	--	--	3/29/2010	0.0 - 12.0	sunny, mid+ 80s	
Length	4'	--	--	--				
Type	Acetate	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

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

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
1					75SB04-00 + duplicate		TOPSOIL (organics) 0.2 SILT to GRAVEL, some clay; brown; dry to damp; non plastic loose (fill) 1.3	110.2 109.1
2		D-1	2.6 65%		75SB04-01 +MS/MSD	BKG	SILT to MEDIUM SAND (beach sand), little shells; whitish, light tan; dry to damp; non plastic; loose (fill)	
3								
4	4.0							
5							same as above and damp	
6		D-2	2.8 70%			BKG		
7								
8	8.0				75SB04-04			
9							same as above and wet/saturated (very little recovery)	
10		D-3	1.2 30%			BKG		

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 75SB04 SHEET 1 OF 2

Baker

Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75

SO NO.: 119197, 6.8 BORING NO.: 75SB04

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
11		D-3	1.2			BKG	Continued from Sheet 1	
12	12.0		30%					98.4
13							End of Boring at 12.0'	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

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

DRILLER: William Rodrigez BORING NO.: 75SB04 SHEET 2 OF 2

Baker
Michael Baker Jr., Inc.

TEST BORING RECORD

PROJECT: Naval Activity Puerto Rico SWMU 75
PROJ. NO.: 119197, 6.8 BORING NO.: 75SB05
COORDINATES: EAST: 939578.8661 NORTH: 798963.3790
ELEVATION: SURFACE: 109.9

Rig:	Geoprobe Track Rig 6610 DT				Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
	Macro Sampler	Casing	Augers	Core Barrel				
Size (ID)	1-5/8"	--	--	--	3/29/2010	0.0 - 12.0	sunny, mid+ 80s	
Length	4'	--	--	--				
Type	Acetate	--	--	--				
Hammer Wt.	--	--	--	--				
Fall	--	--	--	--				

Remarks: PID background (BKG) is 0.0.

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

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BKG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm)	Visual Description	Elevation (Ft. Datum)
1					75SB05-00		TOPSOIL (organics) 0.1 SILT to MEDIUM SAND (beach sand), little shells;	109.8
2		D-1	2.2 55%		75SB05-01	BKG	whitish, light tan; dry to damp; non plastic; loose (fill)	
3								
4	4.0						DPT refusal at 4.0' (0.1' concrete in DPT sampler nose); terminate 75SB05 at 4.0'	105.9
5							End of Boring at 4.0'	
6								
7								
8								
9								
10								

DRILLING CO.: GeoEnviroTech, Inc. BAKER REP.: Robert Roselius
DRILLER: William Rodrigez BORING NO.: 75SB05 SHEET 1 OF 1

CHAIN-OF-CUSTODY FORMS

Residual Chlorine Present?
Yes ______ No ✓

16060

Page 1 of 3

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SV + DRO: 1-8oz

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4743
Sampling Complete? (Y) or N

Client/Reporting Information

Company Name: Baker Environmental, Inc.
Address: 100 Airside Drive
City: Moon Twp., State: PA Zip: 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 75
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or (N?) If yes, which ID(s)?

Matrices

GW - Ground water
WW - Waste water
SW - Surface water
SO - Soil/Sediment
TB - Trip Blank
RI - Rinsate
WP - Wipe
O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs 40 ml	App IX SVOCs	App IX Metals (Total) 1-2oz	TPH DRO	TPH GRO 2-40 ml or 1-4oz						pH/Sample Info (Lab Use)
1003251-01	75FB01	3/29/10	0850	O	10	5		1				3	2	1	2	2						<2
↓ -02	75ER01	↓	0900	RI	10	5		1				3	2	1	2	2						<2
1003252-01	75SB01-00	↓	1140	SO	6					1	2	3	1	1	✓	1						
-02	75SB01-01	↓	1145	↓	↓					↓	↓	↓	↓	↓	↓	↓						
-03	75SB01-01D	↓	1145	↓	↓					↓	↓	↓	↓	↓	↓	↓						
-04	75SB01-04	↓	1150	↓	↓					↓	↓	↓	↓	↓	↓	↓	Container time is 11:55 [initials] 3/31/10					
-05	75SB02-00	↓	1115	↓	↓					↓	↓	↓	↓	↓	↓	↓						
-06	75SB02-01	↓	1120	↓	↓					↓	↓	↓	↓	↓	↓	↓	Use per Allem					
-07	** 75SB02-04	↓	1125	↓	↓					↓	↓	↓	↓	⓪ ↓	↓	↓						
↓ -08	75SB03-00	3/29/10	0935	SO	6					1	2	3	1	1	✓	1						

Lab Use Only

Sample Unpacked By: [signature]
Sample Order Entry By: [signature]
Samples Received in Good Condition? (Y) or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

75SB02-04 Did not receive MHL sample.

Sample Custody

Relinquished by: [signature]	Date/Time: 3-30-10 1500	Received by: [signature]	Date/Time: 3-31-10 1015
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.0, 0.2, 2.4 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SN0015

16059

Page 2 of 3

SV + DROs = 1-8oz

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CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

Courier: FedEx
Airbill No.:
Sampling Complete? (Y) or N

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 75
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City: Moon Twp., State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Galley/R. Roselius	Are high concentrations expected? Y or N? If yes, which ID(s)?

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	Requested Analysis: App IX VOCs (40 mL)	App IX SVOCs (1-2oz)	App IX Metals (Total) (1-2oz)	TPH DRO (2-40mL or 1-4oz)	TPH GRO (2-40mL or 1-4oz)	pH / Sample Info (Lab Use)
1003252-09	75SB03-01	3/29/10	0940	SO	6					1	2	3	1	1	✓	1	
-10	75SB03-04		0950														
-11	75SB04-00		1015														
-12	75SB04-00D		1015		6												
1003252-13	75SB04-01		1025		6							3	1	1	✓	1	
	75SB04-01 MS				3							3					
	75SB04-01 MSD				3					1	2	3					
	75SB04-01 MS/MSD		1025		3				APP 3/30/10 *		NUT 3/30/10	1	1	✓	1		
1003252-14	75SB04-04		1040	SO	6					1	2	3	1	1	✓	1	
1003251-03	75TB01	3/29/10		TB	5	5						3				2	

Lab Use Only

Sample Unpacked By: [signature]
Sample Order Entry By: [signature]
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

** Label on 2 VOA vials reads 75SB03- Time 0950

Sample Custody

Relinquished by: [signature]	Date/Time: 3-30-10 1500	Received by: [signature]	Date/Time: 3.31.10 1015
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or (N) If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 1.0°, 0.2 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SW0015

16058

Page 3 of 3

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CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

501 Madison Ave.
Cary, NC 27513
Phone: 919-379-4100 Fax 919-379-4040

SV + DRO = 1-8oz

Courier: FedEx
Airbill No.:
Sampling Complete? (Y) or N

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 75
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City: Moon Twp., State: PA Zip: 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or N? If yes, which ID(s)?

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	Number of Preserved Bottles: HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs 40 ml	App IX SVOCs 1-2oz	App IX Metals (Total) 1-2oz	TPH DRO	TPH GRO 1-4oz
1003252-15	755B05-00	3/29/10	1000	SO	6					1	2	3	1	1	✓	1
↓ 16	755B05-01	3/29/10	1005	SO	6					1	2	3	1	1	✓	1

Matrices: GW - Ground water; WW - Waste water; SW - Surface water; SO - Soil/Sediment; TB - Trip Blank; RI - Rinsate; WP - Wipe; O - Other

pH / Sample Info (Lab Use)

Lab Use Only

Sample Unpacked By: Dawn Byrd
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:

Cyanide samples checked for sulfide & chlorine? Y or (NA)
625 & Phenol samples checked for chlorine? Y or (NA)
608 samples checked for pH between 5.0-9.0? Y or (NA)

Comments

Sample Custody

Relinquished by:	Date/Time: 3-30-10 1500	Received by: Dawn Byrd	Date/Time: 3.31.10 1015
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or (N) If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 10.02 °C

Samples stored 60 days after date report mailed at no extra charge.

White & Yellow copy to lab • Pink copy for customer

SN005

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	NAPR-W75-MW02	1 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

Weather: 73°F, Partly Cloudy

Sample Team: Juan Acaron

Total Depth: 14.80 FT.(BTOC) Measured

Depth to Water: (-) 8.62 FT.(BTOC) Measured

Water Column(h): (=) 6.18 FT. — IN.

Water Volume in Well 0.98 GAL 0.16

Pump Depth: 11.00 FT.(BTOC) Measured

Purge Device/Equip: S.S. Monsoon

Measuring Device/Equipment: Solinst Interface Probe, YSI 556, HACH 2100Q turbidimeter

Date and Time On Well: 1100 8/27/12

Pump Start Date and Time: 1113 8/27/12

Pump Finish Date and Time: 1240 8/27/12

Date and Time Off Well: 1245 8/27/12

Air Monitoring Readings: 0.0

Total Purge Volume: 3.3 **GAL.**

SAMPLE INFORMATION

Sample ID: NAPR-W75-GW02-0812

Sample Date/Time: 8/27/12 1215

Field Dup: YES (NO) ID: —

FD Sample Date/Time: —

MS/MSD: YES (NO)

Were samples filtered? (YES) NO

If YES, Which samples? Metals

Sample Analyses: SVOC, Metals (Lead only), FMETALS, WCHEM (CL, TDS, Salinity)

Sample Analyses: (FD) —

Sample Appearance: Clear

Field Test Kit Details: NONE

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS g/L	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1121	0.5	8.81	225	32.42	1655	0.82	1.076	14.5	1.04	6.92	31.0	166	Milky white/none
1128	1.0	3.75	200	32.74	1671	0.83	1.086	14.1	1.02	6.93	23.1	77.9	
1133	1.25	8.77	250	32.85	1689	0.84	1.098	13.3	0.95	6.93	24.5	34.4	
1138	1.50	8.74	250	32.92	1699	0.85	1.104	9.5	0.69	6.94	26.5	20.1	Clear/none
1143	1.75	8.77	250	32.85	1703	0.85	1.108	8.7	0.62	6.93	25.4	12.0	
1148	2.00	8.77	250	32.78	1714	0.85	1.114	7.0	0.50	6.92	29.4	7.45	
1153	2.25	8.77	250	32.80	1720	0.86	1.118	6.6	0.48	6.92	32.0	5.73	
1158	2.50	8.77	250	32.71	1723	0.86	1.120	6.2	0.44	6.92	34.4	4.28	
1203	2.75	8.77	250	32.65	1730	0.86	1.124	5.8	0.42	6.94	34.4	3.81	Clear/NONE
1208	3.00	8.77	250	32.64	1732	0.86	1.126	5.5	0.39	6.94	39.5	3.62	clear/NONE
1213	3.25	8.77	250	32.66	1732	0.86	1.125	5.7	0.41	6.94	40.1	3.75	Clear/NONE

8/27/12

Signature: [signature] Date: 8/27/12

CH2MHILL

PROJECT NUMBER: 418481.FI.FK

WELL NUMBER: NAPR - W75-MW02

SHEET 2 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling   LOCATION : Ceiba, Puerto Rico   DATE:

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments

8/27-17

Signature: ____________________   Date: ____________________

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 3 OF 3
418481.FI.FK	NAPR-W75-MW02	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

NOTES (CONTINUED)

SOP(s) used (refer to SOPs in back of this log)? B-1

Were all requirements of the SAP, PIs and above mentioned SOP(s) met? Yes

Explanation of exceptions to SAP, PI's and SOP(s) ***including why, under what conditions, who authorized exception, anything considered in the decision*****:**

NONE

PHOTO LOG

Photo Numbe	Compass Direction	Time	Description

Signature: _____ Date: 8/27/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 1 OF 3
418481.FI.FK	NAPR- W75 - MW03	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

Weather: 82°F, Cloudy

Sample Team: Juan Acaron

Total Depth: 14.35 FT.(BTOC) Measured

Depth to Water: (-) 9.11 FT.(BTOC) Measured

Water Column(h): (=) 5.24 FT. ~~0.84~~ IN.

Water Volume in Well 0.84 GAL

Pump Depth: 11.5 FT.(BTOC) Measured

Purge Device/Equip: SS. Monsoon

Measuring Device/Equipment: YSI 556, Solinst Interface Probe, HACH 2100Q Turbidimeter

Date and Time On Well: 1600 8/27/12

Pump Start Date and Time: 1603 8/27/12

Pump Finish Date and Time: 1755 8/27/12

Date and Time Off Well: 1800 8/27/12

Air Monitoring Readings: 0.0 ppm

Total Purge Volume: 4.25 GAL.

SAMPLE INFORMATION

Sample ID: NAPR-W75-GW03-0812

Sample Date/Time: 8/27/12 1735

Field Dup: YES (NO) ID:

FD Sample Date/Time:

MS/MSD: YES / (NO)

Were samples filtered? (YES) / NO

If YES, Which samples? METAL

Sample Analyses: SVOC, Metal, FMETH, (WCHEM (TDS, CL, Salinity)

Sample Analyses: (FD)

Sample Appearance:

Field Test Kit Details:

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1608	0.25	9.14	250	29.72	5306	2.84	3.447	7.1	0.53	7.03	-147.8	480	milky white / fuel
1613	0.50	9.14	250	30.04	5405	2.89	3.514	4.3	0.32	7.06	-180.8	15.2	
1618	0.75	9.14	250	30.10	5483	2.94	3.565	3.5	0.26	7.06	-186.2	30.9	
1623	1.25	9.14	250	30.15	5686	3.05	3.698	3.5	0.26	7.05	-188.9	48.2	
1628	1.50	9.14	250	30.14	5853	3.15	3.808	2.5	0.19	7.05	-185.1	23.8	Clear / fuel
1643	1.75	9.14	250	30.15	6022	3.25	3.917	2.3	0.17	7.05	-210.2	15.1	
1648	2.00	9.14	250	30.16	6142	3.32	3.994	2.0	0.14	7.05	-195.1	10.8	
1653	2.25	9.14	250	30.22	6214	3.36	4.041	1.9	0.14	7.05	-223.7	7.82	
1658	2.50	9.14	250	30.18	6374	3.45	4.144	1.9	0.14	7.04	-209.5	5.38	
1703	2.75	9.14	250	30.21	6414	3.48	4.188	1.7	0.12	7.04	-218.8	4.29	Clear / fuel
1708	3.00	9.14	250	30.20	6527	3.54	4.243	1.5	0.11	7.03	-233.5	3.81	
1713	3.25	9.14	250	30.46	6620	3.58	4.298	1.8	0.13	7.03	-239.5	3.31	
1718	3.50	9.14	250	30.39	6791	3.64	4.358	1.5	0.11	7.03	-242.2	3.18	
1723	3.75	9.14	250	30.40	6799	3.69	4.422	1.5	0.11	7.03	-199.2	3.47	
1728	4.00	9.14	250	30.38	6794	3.68	4.420	1.4	0.10	7.03	-201.5	3.32	
1733	4.25	9.14	250	30.38	6799	3.67	4.417	1.4	0.10	7.03	-203.3	3.20	Clear / fuel

8/27/12

Signature:

Date: 8/27/12

CH2MHILL

PROJECT NUMBER: 418481.FI.FK

WELL NUMBER: NAPR-W75-MW03

SHEET 2 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments

8/27/12

Signature: [signature] Date: 8/27/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 3 OF 3
418481.FI.FK	NAPR-W75-MW03	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

NOTES (CONTINUED)

SOP(s) used (refer to SOPs in back of this log)? B-1

Were all requirements of the SAP, PIs and above mentioned SOP(s) met? YES

Explanation of exceptions to SAP, PI's and SOP(s) ***including why, under what conditions, who authorized exception, anything considered in the decision*****:**

N/A

PHOTO LOG

Photo Numbe	Compass Direction	Time	Description

Signature: _____ Date: 8/27/12

CH2MHILL

PROJECT NUMBER 418481.FI.FK | WELL NUMBER NAPR-MW75-GW04 | SHEET 1 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 08/28/12

Weather: cloudy, hot, humid

Sample Team: J Acaron, D Whitaker

Total Depth: 14.30 FT.(BTOC) Measured

Depth to Water: (-) 8.70 FT.(BTOC) Measured

Water Column(h): (=) 5.60 FT.

Water Volume in Well 0.91 GAL (0.163)

Pump Depth: 11.00 FT.(BTOC) Measured

Purge Device/Equip: SS. Monsoon

Measuring Device/Equipment: YSI 556, HACH 2100Q Turbidimeter, Solinst OIP

Date and Time On Well: 08/28/12 1000

Pump Start Date and Time: 08/28/12 1016

Pump Finish Date and Time: 08/28/12 1250

Date and Time Off Well: 08/28/12 1300

Air Monitoring Readings: 0.0ppm

Total Purge Volume: 6.25 GAL.

SAMPLE INFORMATION

Sample ID: NAPR-MW75-GW04-0812

Sample Date/Time: 08/28/12 1215 (MS) / 1220 / 1225 (SD)

Field Dup: YES/(NO) ID: —

FD Sample Date/Time: —

MS/MSD: (YES) / NO

Were samples filtered? (YES) / NO

If YES, Which samples? filtered metals (iron only)

Sample Analyses: SVOCs, METAL, F METAL, WCHEM (TDS, CL, Solinity)

Sample Analyses: (FD) N/A

Sample Appearance: Clear

Field Test Kit Details: N/A

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS g/L	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1026	0.50	8.74	250	30.02	7013	3.82	4.556	6.7	0.49	6.89	-109.5	214	Cloudy, Fuel
1031	0.75	8.74	250	29.89	6342	3.72	4.438	4.9	0.36	6.90	-93.5	94.2	
1036	1.00	8.74	250	29.95	6765	3.67	4.394	4.4	0.32	6.90	-93.1	68.0	
1041	1.25	8.74	250	30.24	6525	3.53	4.233	3.7	0.27	6.90	-92.2	36.7	
1046	1.50	8.74	250	30.42	6318	3.41	4.105	3.2	0.24	6.89	-95.6	20.4	
1051	1.75	8.74	250	30.48	6200	3.35	4.029	3.2	0.24	6.89	-95.6	13.5	
1056	2.00	8.74	250	30.64	5992	3.22	3.891	2.9	0.21	6.89	-87.3	9.87	Clear / Fuel
1101	2.25	8.74	250	30.78	5758	3.10	3.755	2.6	0.19	6.89	-86.2	8.14	
1106	2.50	8.74	250	30.84	5612	3.00	3.637	2.3	0.17	6.89	-90.1	6.82	
1111	2.75	8.74	250	30.86	5519	2.95	3.585	2.4	0.18	6.89	-84.9	4.21	
1116	3.0	8.74	250	28.90	3941	2.07	2.573	1.3	0.10	6.95	-107.4	3.82	
1121	3.25	8.74	250	29.78	5652	3.00	3.731	1.6	0.12	6.89	-103.2	2.74	Clear / Fuel
1126	3.75	8.74	250	30.22	6044	3.26	3.928	1.7	0.13	6.89	-96.3	3.14	
1131	4.0	8.74	250	30.26	5928	3.19	3.846	1.6	0.12	6.90	-92.7	2.84	
1136	4.25	8.74	250	30.30	5331	2.86	3.485	1.5	0.11	6.90	-82.9	3.28	
1141	4.50	8.74	250	30.27	4706	2.49	3.052	1.5	0.11	6.91	-77.0	2.84	
1146	4.75	8.74	250	30.27	4596	2.43	2.985	1.7	0.11	6.91	-78.9	4.27	
1151	5.00	8.74	250	30.28	4562	2.41	2.963	1.9	0.14	6.92	-89.7	5.74	Clear / Fuel
1156	5.25	8.74	250	30.21	4470	2.36	2.899	1.8	0.13	6.92	-89.3	6.19	

Signature: [signature]

Date: 8/28/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 2 OF 3
418481.FI.FK	NAPR-W75-MW04	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/28/12

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1201	5.50	8.74	250	30.25	4361	2.28	2.831	1.9	0.14	6.91	-88.0	3.90	
1206	6.00	8.74	250	30.26	4345	2.29	2.822	2.1	0.15	6.91	-87.8	3.84	
1211	6.25	8.74	250	30.31	4351	2.27	2.829	1.9	0.14	6.92	-87.0	4.17	Clear/Fuel

8-28-12

Signature: _____ Date: 8/28/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	NAPR-W75-MW04	3 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/28/12

NOTES (CONTINUED)

SOP(s) used (refer to SOPs in back of this log)? B-1

Were all requirements of the SAP, PIs and above mentioned SOP(s) met? NO

Explanation of exceptions to SAP, PI's and SOP(s) *including why, under what conditions, who authorized exception, anything considered in the decision*:

MS/MSD was taken @ this location, contacted Project chemist and he indicated that QC was selected @ random.

PHOTO LOG

Photo Numbe	Compass Direction	Time	Description

Signature: _____ Date: 8/28/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 1 OF 3
418481.FI.FK	NAPR - W75-MW05	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

Weather: 77°F Cloudy

Sample Team: JUAN KEARON

Total Depth: 15.42 ~~20.85~~ FT.(BTOC) Measured

Depth to Water: (-) 8.75 FT.(BTOC) Measured

Water Column(h): (=) 6.67 FT. ~~GAL~~

Water Volume in Well 1.07 GAL

Pump Depth: 11 FT.(BTOC) Measured

Purge Device/Equip: SS. MONSOON

Measuring Device/Equipment: Solinst Interface probe, YSI 556, HACH 2100Q turbidimeter

Date and Time On Well: 8/27/12 1345

Pump Start Date and Time: 8/27/12 1353

Pump Finish Date and Time: 8/27/12 1535

Date and Time Off Well: 8/27/12 1545

Air Monitoring Readings: 1.6 ppm

Total Purge Volume: 3.8 **GAL.**

SAMPLE INFORMATION

Sample ID: NAPR-W75-GW05-0812

Sample Date/Time: 8/27/12 1500

Field Dup: YES/NO ID: NAPR-W75-GW05FP-0812

FD Sample Date/Time: 8/27/12 1505

MS/MSD: YES / (NO)

Were samples filtered? (YES) / NO

If YES, Which samples? Metals

Sample Analyses: SVOCs, Metals, FMETAL, WCHEM (TDS, CL, Salinity)

Sample Analyses: (FD) SVOCs, METAL, FMETAL

Sample Appearance: Clear

Field Test Kit Details: NONE

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments
1403	0.5	8.82	250	30.77	1062	0.52	0.690	10.7	0.79	6.95	15.3	551	Milky White / NONE
1408	0.75	8.82	250	31.22	1053	0.51	0.685	6.4	0.47	6.91	8.8	381	
1413	1.00	8.82	250	31.34	1055	0.52	0.685	5.3	0.39	6.90	-6.5	133	
1418	1.25	8.82	250	31.46	1051	0.51	0.683	4.1	0.30	6.90	-12.5	51.7	
1423	1.50	8.82	250	31.55	1049	0.51	0.682	5.0	0.36	6.90	-11.3	36.9	Clear / NONE
1428	2.00	8.82	250	31.58	1046	0.51	0.680	3.8	0.28	6.91	6.1	29.5	
1433	2.25	8.82	250	31.52	1045	0.51	0.679	3.9	0.29	6.91	9.5	23.2	
1438	2.50	8.82	250	31.61	1044	0.51	0.679	3.3	0.24	6.91	-2.3	19.9	Clear / NONE
1443	2.75	8.82	250	31.70	1041	0.51	0.676	2.6	0.19	6.92	-0.2	18.5	
1448	3.00	8.82	250	31.75	1039	0.51	0.675	2.3	0.17	6.91	1.4	15.8	
1453	3.50	8.82	250	31.73	1039	0.51	0.675	2.4	0.17	6.92	9.1	16.2	
1458	3.75	8.82	250	31.70	1038	0.51	0.675	2.2	0.16	6.92	6.7	15.6	Clear NONE

8/27/12

Signature: [signature]

Date: 8/27/12

CH2MHILL

PROJECT NUMBER: 418481.FI.FK

WELL NUMBER: NAPR-W75-MW05

SHEET 2 OF 3

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling   LOCATION : Ceiba, Puerto Rico   DATE: 8/27/12

FIELD PARAMETERS

Time	Purged Vol. (gals)	Depth to Water (ft)	Flow Rate (mL/min)	Temp., (°C)	SpCond (uS/cm) w/in 3%	Salinity (ppt)	TDS	DO (%)	DO (mg/L) w/in 10%	pH w/in 0.1	ORP (mV) w/in 10mV	Turbidity (NTU) w/in 10%	Color / Odor / Comments

8/27/12

Signature: ______   Date: 8/27/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET 3 OF 3
418481.FI.FK	NAPR-W75-MW06	

GROUNDWATER SAMPLING DATA SHEET

PROJECT : NAPR SWMU 75 Groundwater Sampling LOCATION : Ceiba, Puerto Rico DATE: 8/27/12

NOTES (CONTINUED)

SOP(s) used (refer to SOPs in back of this log)? B-1

Were all requirements of the SAP, PIs and above mentioned SOP(s) met? NO

Explanation of exceptions to SAP, PI's and SOP(s) ***including why, under what conditions, who authorized exception, anything considered in the decision*****:**

Field Duplicate taken @ this well. Contacted PC, and he verified that locations for QC were selected randomly.

PHOTO LOG

Photo Numbe	Compass Direction	Time	Description

Signature: _____ Date: 8/27/12

CH2MHILL.
3011 S.W. Williston Road
Gainesville, FL 32608
Tel No: (352) 384-7002
Fax No: (352) 214-2814

CHAIN-OF-CUSTODY RECORD

[1] COC NUMBER: **418481-082812-01**

[2] PROJECT NAME:	[5] PROJECT NUMBER:	[8] LAB NAME AND CONTACT:	[11] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)	[14] RECIPIENT 1 (Address, Tel No. , and Fax No.):
NAPR SWMU 75	**418481.FI.FK**	**Katahdin Analytical Services, Inc. Jennifer Obrin**	**Mike Zamboni Michael.Zamboni@ch2m.com**	**15010 Conference Center Dr. Suite 200, Chantilly, VA 20151 phone: 703-376-5301**
[3] PROJECT PHASE/SITE/TASK:	[6] CTO OR DO NUMBER:	[9] LAB PO NUMBER:	[12] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)	[15] RECIPIENT 2 (Address, Tel No. , and Fax No.):
August 2012 GW Sampling	**JM05**	**non-PO**		
[4] PROJECT CONTACT:	[7] PROJECT TEL NO AND FAX NO:	[10] LAB TEL NO AND FAX NO:	[13] FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)	[16] RECIPIENT 3 (Address, Tel No. , and Fax No.):
Mike Zamboni	**703-376-5301 phone**	**(207)-874-2400 phone (207)-775-4029 fax**		

[17] ITEM	[19] SAMPLE ID	[20] MATRIX (see codes on SOP)	[21] DATE COLLECTED	[22] TIME COLLECTED	[23] DATA PKG LEVEL (see codes on SOP)	[24] TAT (calendar days)	PAHs by SW-846 8270_SIM	Metal (Lead only) by SW-846 6010C	Filtered Metal (Lead only) by SW-846 6010C	Chloride by SW-846 9056	TDS by SM2540C	Salinity by SM2520B	Full TCLP VOC, SVOC, Pest, Herb, Metals, and RCI	[26] SAMPLE TYPE (see codes on SOP)	[27] COMMENTS/ SCREENING READINGS	[28] LAB ID (for lab's use)
1	NAPR-W75-GW02-0812	**GW**	**8/27/2012**	**1215**	**IV**	**28**	**X**	**X**	**X**	**X**	**X**	**X**		**N**		
2	NAPR-W75-GW05-0812	**GW**	**8/27/2012**	**1500**	**IV**	**28**	**X**	**X**	**X**	**X**	**X**	**X**		**N**		
3	NAPR-W75-GW05P-0812	**GW**	**8/27/2012**	**1505**	**IV**	**28**	**X**	**X**	**X**					**FD**		
4	NAPR-W75-GW03-0812	**GW**	**8/27/2012**	**1735**	**IV**	**28**	**X**	**X**	**X**	**X**	**X**	**X**		**N**		
5	NAPR-W75-EB-082712	**AQ**	**8/27/2012**	**1830**	**IV**	**28**	**X**	**X**	**X**					**EB**		
6	NAPR-W75-GW04-0812	**GW**	**8/28/2012**	**1215**	**IV**	**28**	**X**	**X**	**X**	**X**	**X**	**X**		**N**		
7	NAPR-W75-GW04-0812-MS	**GW**	**8/28/2012**	**1220**	**IV**	**28**	**X**	**X**	**X**					**MS**		
8	NAPR-W75-GW04-0812-SD	**GW**	**8/28/2012**	**1225**	**IV**	**28**	**X**	**X**	**X**					**MSD**		
9	NAPR-W75-EB-082812	**AQ**	**8/28/2012**	**1335**	**IV**	**28**	**X**	**X**	**X**					**EB**		
10	NAPR-W75-IW01-082812	**IW**	**8/28/2012**	**1310**	**IV**	**28**							**X**	**IW**		
11																
12																
13																

[29] SAMPLER(S) AND COMPANY: (please print)	[30]Federal Express Tracking Number(s):	[31] SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT (for lab's use):
Juan Acaron/GNV Dia Whitaker/PHL		

[32] RELINQUISHED BY	DATE	TIME		DATE	TIME
Printed Name and Signature:					
Juan Acaron	28-Aug-2012	1600			
Printed Name and Signature:					
Printed Name and Signature:					

Distribution: **[ ] Original** - Laboratory (To be returned with Analytical Report); **[ ] Copy 1** - Project File; **[ ] Copy 2** - PMO

Form CCI001, Rev 06/00

NAPR SWMU 75

Rite in the Rain®

ALL-WEATHER

ENVIRONMENTAL FIELD BOOK

№ 550

CONTENTS

PAGE	REFERENCE	DATE

Location NAPR SWMU 75 Date 08/20/12

Project / Client NAVY CLEAN

Groundwater sampling

0730 D. Whitaker and J. Pearson (CH2M Hill) go to Home Depot to pick up supplies and ice from grocery store.

1030 Onsite at NAPR to "sign in" with other group out here on AGVIQ joint-venture SBRAC project - they give us keys, AMAP, and show us our drum staging location. (Conduct H&S meeting with PTS and go over H&S plan - sign off.)

NOTE: @ ~ 1000 this morning onsite environmental dropped off 4-33 gal plastic drums, 1 pallet and 1-55 gal metal drum for PPE.

1130-1200 break for lunch.

1200- At "warehouse" - old filling station / grocery store where we work out of - to open all equipment and supplies and get organized. Account for all lab containers / open all coolers.

1330 Call K. Mayer (CH2M warehouse Mgr) - GPS wasn't sent - get one overnighted and get 5 well caps (7") overnighted - ones on wells currently are broken and may fall down well or let sediment in the well.

1340 At SWMU 75 - find MW-02 and MW05. In pursuit of MW-04.

1450 Found MW04 - located in NE corner of BLDG 803 - well is in heavily vegetated area - CONDUCT

08/20/12

Location NAPR SWMU 75 Date 08/20/12

Project / Client NAVY CLEAN

HAND VEGITATION clearance to clear ~ 10ft WIDE path BACK to the well from the open area. Open well - use cup to get at standing water - has paint chips too. Put new well cap on well. Move to 803-MW01 to find well - look with map and use SCHONDSTADT to try to locate.

1515 Using map and schondstedt - cannot find 803-MW01. Also used shovel to dig up ~ 3'x 3'x 6" - 8" deep area where should have been located. Photo 1: D. Whitaker using schonstedt to try to locate 803-MW01. Photo 2: J. Aeron using shovel to dig at area where 803-MW01 is supposed to (at one time was) be located. 803-MW01 is located in an area with old concrete foundations and where newer looking drainage appears to be installed - it is known from the client (PEDRO RUIZ/NAVY) that this site has been reconstructed many times.

1600 FOUND 803-MW04 in front of the substation (BLDG 978) Photos 3 and 4 taken to show well location. Monitoring well was ~ 4" below ground surface (bgs).

D. Whitaker 08/20/12

Location NAPR SWMU 75 Date 08/20/12

Project / Client NAVY CLEAN

1630 At warehouse to unpack / repack vehicle for redevelopment tomorrow.

1700 At store to pick up 2 spray bottles for decon.

1720 END of day IN field today.

D. Whitaker 08/20/12

Location NAPR SWMU 75 Date 08/21/12

Project / Client NAVY CLEAN

MW Re-development

0800 Get to near base. Usual entrance is closed - have to find other entrance to base.

0845 At SWMU 75 set up for equipment calibration. Review development SOP.

0910 Write & review PTSP / D. whitaker and J. Macaron (CH2M Hill) SIGN OFF.

0950 HAD to go to warehouse to get other YSI - first YSI not working - call Pine env. have them overnight us another YSI. Calibrating this YSI

1000 Open 803-MW03 and take total depth. PID reading when open well = 0.0ppm at top of well casing.

1050 Start surge block at 803-MW03 - development begins. See workbook for specific development information.

1201 Finish development at 803-MW03 - parameters stabilized and turbidity below 5NTU.

1230-1300 Lunch

1310 Set up at 803-MW04 - wait for storm to pass.

1330 Begin surge blocking @ 803-MW04.

1522 Finish development @ 803-MW04

* NOTE: Weather has been hot and humid with bands of high winds and thunderstorms

J. Whitaker 08/21/12

Location NAPR SWMU 75 Date 08/21/12

Project / Client NAVY CLEAN

MW Re-development

with lightening and heavy rains - intermittantly taking breaks to take shelter in vehicle

1530 At drum staging area - dump purge water from carboys in vehicle into 33gal plastic drums on a pallet at the SWMU 7/8 fenced area.

1537 At 803-MW05 to begin surging/purging redevelopment.

1726 End of redevelopment - well stabilized and cleared up well. Go to dump purge water.

1740 Offsite for today.

J. Whitaker 08/21/12

Location NAPR SWMU 75 Date 08/22/12

Project / Client MARY CLEAN

Well Re-Development

0745 Pick up ice for drink cooler.

0815 At warehouse. Pick up GPS and hook up components - figure out set up.

0 Pack vehicle with equipment to find 803-MW01.

0845 Head to SWMU 75 to set up for well development and finding MW01.

0930 Calibrate YSI, PID, take turbidimeter readings. D. Whitaker works with GPS to load coordinates.

1005 Calibration complete. Go back to warehouse - forgot one cable cord needed for GPS.

1020 Back to SWMU 27. Fill out PTSP and hold HASS Tailgate briefing.

1035 On 803-MW02 - begin development. See NAPR SWMU 75 Field workbook for more/detailed development info.

* NOTE: When first opened wells on 08/20/12, put new well cap on each well.

1148 Completed redevelopment at 803-MW01

Trying to fix coordinate system in GPS to be correct for Puerto Rico.

1250 TRIED to find Monitoring well location

DJWhite 08/22/12

AGAIN with Schonstadt and D shovel. Carlos (AGVIQ) comes by site and shows D. Whitaker where he believes the well was once located. J. Aaron (Carlos) digs the area where he mentions to ~3/4" bgs but a well is not found. Leave SWMU 75 - dump purge water into 33 gal drum @ SWMU 718. Go to the warehouse to unload SUV.

1330 Offsite.

DJWhite 08/23/12

Location NAPR SWMU 75 Date 08/28/12

Project / Client NAVY CLEAN

Groundwater SAMPLING

0830 Leave for site - J. Acaron (CH2M Hill)

0800 At "warehouse" building 2339 to discuss today's work plan with Carlos (AGVIQ) - he shows where to get ice and takes J. Acaron to pick up fedexed items at the Security office.

0930 J. Acaron fills out A PTSP and has a H&S tailgate briefing. J. Acaron is working alone tod ay and will be calling or will be called by the FTL D. Whitaker (CH2M Hill).

0945 Decontaminate the 2 pumps and WL meters.

1015 Onsite at SWMU 75

1020 Conduct baseline depth-to-water survey

	DTW (bTOC)	DTP (Product) (bTOC)	Total Depth (bTOC)
803-MW01	— Well Destroyed		
803-MW02	8.61	—	14.80
803-MW03	9.21	—	14.35
803-MW04	8.70	—	13.75
803-MW05	8.71	—	15.42

Measured below top-of-casing

1035 Calibrate equipment

1100 Set up on | 803-MW02 | for groundwater sampling.

1215 Collect gw sample | NAPR-W75-GW01-MW02 |

1240 Finished collecting sample @ 803-MW02

1248 Leave to pick up lunch

08/28/12

Location NAPR SWMU 75 Date 08/27/12

Project / Client Navy Clean

Groundwater SAMPLING

1315 At SWMU 75 - heavy rain - wait until stops.

1345 Set up for gw sampling @ 803-MW05

1500/ Collect groundwater sample | NAPR-W75-GW05-0812 |

1505 and field duplicate | NAPR-W75-GW05P-0812 |

* All samples collected for SVOCs (PAHs), Metals (Lead only), Filtered Metals (Lead only), salinity, TDS, and Chloride.

1545 Finish collecting gw sample @ 803-MW05.

* Between each sample location decon pump (Monsoon; stainless steel) and dump purge water @ SWMU 7/8 staging area.

1600 Set up for groundwater sampling @ 803-MW03

1735 Collect groundwater sample | NAPR-W75-GW03-0812 |

1800 Finished collecting gw sample @ 803-MW03

1830 Collect equipment blank sample | NAPR-W75-EB-082712 | using DI water by Fischer Scientific CAS. 7732-18-5 Lot. 123009 to pour through the pump and into the appropriate sample containers.

* All samples are in coolers on ice, coolers are custody sealed and secured in the field vehicle.

1850 Offsite.

08/28/12

Location NAPR SWMU 7S Date 08/28/12

Project / Client NAVY CLEAN

Groundwater sampling

0830 Leave for the site

0900 D. Whitaker & J. Acaron (CH2M Hill) onsite at "warehouse" bldg 2339 to pack car and put new ice on samples.

0930 At SWMU 7S, calibrate equipment. D. Whitaker writes in field notes for 08/27/12 - they were written on loose leaf paper.

1000 At 803-MW04 to set up for groundwater sampling.

1016 Start purging at 803-MW04.

(1000) J. Acaron / D. Undaker fill out PTSP and talk about today's safety issues / tips.

1215 Collect gw sample NAPR-W7S-GW04-0812

1220 Collect gw sample NAPR-W7S-GW04-0812-MS

1225 Collect gw sample NAPR-W7S-GW04-0812-SD

1250 Finished collecting gw sample - go to IDW area.

1300 At IDW SWMU 7/8 area to set up for equipment blank and IDW sample. Decon Monsoon pump. All purge water & decon water is dumped into the 3-33 gal plastic drums. All PPE is set in the 1-55 gal metal drum. All drums have been labeled.

1310 Collect IDW sample from the 3-33 gal plastic drums using a bailer to fill

08/28/12

Location NAPR SWMU 7S Date 08/28/12

Project / Client NAVY CLEAN

Groundwater Sampling

6 - 1L amber glass jars for TCLP SVOCs, herbicides, pesticides and metals and 3 - 40mL clear glass HCl pres. for TCLP VOCs.

NAPR-W7S-IW01-082812

1335 Equipment blank is collected same as yesterday using DI water to pour through the Monsoon pump and into 2-1L amberglass for SVOCs, 1-250mL HNO_3 pres for Metals (6010C) and 1-250mL HNO_3 pres for filtered metals (6010C).

1350 Do the waste management logs at SWMU 7/8 IDW staging area.

1410 Move to warehouse to pack all equipment, organize and store all supplies and bought equipment, and pack sample coolers.

1530 At Gas Station - pack coolers with fresh ice and tape up. for FedEx.

1600 Drive to FedEx in San Juan.

1645 At FedEx in San Juan - prepare all air bills and ship coolers and equipment.

1730 D. Whitaker leaves FedEx for Airport.

1750 J. Acaron leaves FedEx. End of today's field activities.

08/28/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	803 - MW02	1 of 1

WELL DEVELOPMENT LOG

PROJECT : NAPR SWMU 75 Groundwater Sampling — LOCATION : Ceiba, Puerto Rico — DATE: 08/22/12

DEVELOPMENT CONTRACTOR : CH2M Hill, Inc.

DEVELOPMENT METHOD AND EQUIPMENT USED : surge block and big peristaltic pump (high vol. pumping)

START WATER LEVELS : 8.58 ft bTOC — START : 1035 — END : 1148 — LOGGER : D. Whitaker / J. Acaron

MAXIMUM DRAWDOWN DURING PUMPING: 1.59 ft

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED: 18.5 gal

DISPOSITION OF DISCHARGE WATER: very turbid brown/grayish brown to clear/colorless

TOTAL DEPTH OF WELL: 14.80 ft bTOC — PID = 0.0 ppm when well opened

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (µmhos/cm)	Comments
1035	0.0	8.58	—	—	—	—	Start surge
1038	0.0	—	—	—	—	—	Stop surge
1040	0.0	10.00	—	—	—	—	Start purge
1046	3.5	10.10	90.0	30.80	7.11	1893	
1050	4.5	10.12	—	—	—	—	Stop purge - dump bucket
1051	4.5	—	—	—	—	—	Start surge
1053	4.5	—	—	—	—	—	Stop surge
1055	4.5	—	—	—	—	—	Start purge
1106	9.0	10.17	144	30.46	6.94	1942	
1107	9.0	—	—	—	—	—	Stop purge
1108	9.0	—	—	—	—	—	Start surge
1113	9.0	—	—	—	—	—	Stop surge
1114	9.0	—	—	—	—	—	Start pump
1122	13.5	9.87	128	30.42	6.90	1961	slightly cloudy
1127	14.0	9.46	29.1	30.16	6.86	1973	clear colorless
1132	15.25	9.45	25.0	30.31	6.89	1971	"
1136	16.25	9.30	7.64	30.39	6.92	1974	"
1140	17.00	9.30	4.21	30.52	6.93	1977	"
1144	17.75	9.30	3.84	30.57	6.94	1974	"
1148	18.50	9.30	3.49	30.54	6.93	1975	"

08/22/12

Sampler Signature: _____ Date: 8/22/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	803-MW03	1 of 1

WELL DEVELOPMENT LOG

PROJECT : NAPR SWMU 75 Groundwater Sampling — LOCATION : Ceiba, Puerto Rico — DATE: 08/21/12

DEVELOPMENT CONTRACTOR : CH2M Hill, Inc.

DEVELOPMENT METHOD AND EQUIPMENT USED : surge block & large (3gal/min) peristaltic

START WATER LEVELS : 9.18 ft bTOC — START : 1050 — END : — LOGGER : D. Whitaker / J. Aaron

MAXIMUM DRAWDOWN DURING PUMPING: 0.40 ft

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED: 15.00 gal

DISPOSITION OF DISCHARGE WATER: from heavy sediment and milky to clear & colorless

TOTAL DEPTH OF WELL: 14.35 ft bTOC — PID = 0.0 ppm when opened well

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (µmhos/cm)	Comments
1050	—	9.18	—	—	—	—	Start surge block
1052	—	—	—	—	—	—	Stop surge block
1053	Begin	Purging					
1103	3.5	9.42	0874	29.67	7.00	5581	milky white/heavy sed. up to
1107	4.5	—	—	—	—	—	(dump bucket) sand size material
1109	5.0	9.34	212	29.57	7.04	8491	Stop purge
1110	5.0	9.34	—	—	—	—	Start surge
1112	5.0	—	—	—	—	—	Stop surge
(1112)	5.0	—	—	—	—	—	Start purge
1113	5.5	9.40	>1000	29.71	7.15	3709	
1117	7.0	9.48	>1000	29.73	6.94	4716	
1119	8.0	9.47	913	29.59	6.94	7095	Stop purge / dump bucket
1120	8.0	—	—	—	—	—	Start surge
1122	8.0	—	—	—	—	—	Stop surge
(1122)	8.0	—	—	—	—	—	Start purge
1126	9.5	9.48	>1000	29.70	7.09	7290	
1128	11.0	9.48	617	29.56	6.97	7913	
1131	12.0	9.48	278	29.57	6.94	8000	
1138	13.0	9.48	102	29.58	7.02	9271	cloudy
1140	13.5	9.28	70.4	29.54	7.08	5715	
1142	13.75	9.25	39.0	29.42	7.00	6179	slightly cloudy
1146	14.00	9.25	27.7	29.44	7.00	6410	
1151	14.50	9.21	19.2	29.50	7.02	6645	
1156	14.75	9.21	2.71	29.56	6.99	6714	
1201	15.00	9.21	4.19	29.52	7.01	6684	

08/21/12

Sampler Signature: _____ Date: 8/21/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	803-MW04	1 of 1

WELL DEVELOPMENT LOG

PROJECT : NAPR SWMU 75 Groundwater Sampling — LOCATION : Ceiba, Puerto Rico — DATE: 08/21/12

DEVELOPMENT CONTRACTOR : CH2M Hill, Inc.

DEVELOPMENT METHOD AND EQUIPMENT USED : surge block and peristaltic pump

START WATER LEVELS : 8.70 ft bTOC — START : 1330 — END : 1522 — LOGGER : D.Whitaker / J.Acuron

MAXIMUM DRAWDOWN DURING PUMPING: 0.35 ft

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED: 12.50 gal

DISPOSITION OF DISCHARGE WATER: lots of organics - up to fine gravel size - leaves etc very turbid brown to clear/colorless

TOTAL DEPTH OF WELL: 13.75 ft bTOC — PID = 0.0 ppm when well opened

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (µmhos/cm)	Comments
1330	0.0	8.70	—	—	—	—	Start surge
1332	0.0	—	—	—	—	—	Stop surge
1336	0.0	8.70	—	—	—	—	Start purge
1343	2.0	8.95	397	28.34	7.28	4941	
1346	4.5	9.00	>1000	28.34	7.07	4591	Stop purge
1347	4.5	—	—	—	—	—	Start surge
1349	4.5	—	—	—	—	—	Stop surge / Start purge
1359	8.5	9.05	838	28.38	7.32	3,300	Stop purge
1400	8.5	—	—	—	—	—	Start surge
1402	8.5	—	—	—	—	—	Stop surge
1403	8.5	—	—	—	—	—	Start purge / Stop HARD RAIN
1425	8.5	—	—	—	—	—	~~Start purge~~ Start purge
1437	9.0	8.82	163	28.14	7.11	4433	
1442	9.5	8.85	386	28.20	7.03	4174	
1447	9.75	8.80	193	28.34	7.06	3976	
1452	10.00	8.80	159	28.50	7.02	3553	turn up pump speed
1457	10.25	8.85	432	28.61	6.99	3434	turn down pump speed - clear colorless
1502	11.50	8.80	467	28.68	7.01	3192	
1507	11.75	8.80	447	28.78	6.94	4862	
1512	12.00	8.80	435	28.76	7.00	4356	
1517	12.25	8.80	442	28.81	6.95	4412	
1522	12.50	8.80	410	28.82	6.95	4420	

08/21/12

Sampler Signature: [signature] Date: 08/21/12

CH2MHILL

PROJECT NUMBER	WELL NUMBER	SHEET
418481.FI.FK	803- MW05	1 of 1

WELL DEVELOPMENT LOG

PROJECT : NAPR SWMU 75 Groundwater Sampling — LOCATION : Ceiba, Puerto Rico — DATE: 08/21/12

DEVELOPMENT CONTRACTOR : CH2M Hill, Inc.

DEVELOPMENT METHOD AND EQUIPMENT USED : surge block & peristaltic pump (high purge type)

START WATER LEVELS : 8.70 ft btoc — START : 1537 — END : 1726 — LOGGER : D. Whitaker / J. Acaron

MAXIMUM DRAWDOWN DURING PUMPING: 1.42 ft

RANGE AND AVERAGE DISCHARGE RATE:

TOTAL QUANTITY OF WATER DISCHARGED: 18.5 gal

DISPOSITION OF DISCHARGE WATER: extremely turbid with fine sands and silt, milky brown to clear/colorless

TOTAL DEPTH OF WELL: 15.42 ft b TOC — PID = 0.0 ppm when well opened

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (µmhos/cm)	Comments
1537	0.0	8.70	—	—	—	—	Start surge
1542	0.0	—	—	—	—	—	Stop surge
1545	0.0	—	—	—	—	—	Start purge
1552	4.5	—	—	—	—	—	Stop purge
1555	4.5	—	—	—	—	—	Start surge
1558	4.5	—	—	—	—	—	Stop surge
1600	4.5	10.12	—	—	—	—	Start purge
1608	8.5	—	—	—	—	—	Stop purge
1610	8.5	—	—	—	—	—	Start surge
1613	~~10~~ 8.5	—	—	—	—	—	Stop surge
1615	8.5	—	—	—	—	—	Start purge
1625	11.5	—	—	—	—	—	
1630	12.0	10.11	29.6	30.57	6.85	1089	
1634	13.0	9.57	34.3	30.67	6.84	1076	
1638	13.5	9.00	153	30.70	6.83	1073	
~~1644~~ 1642	14.0	8.89	96.7	30.69	6.83	1065	
1646	14.5	8.89	90.1	30.63	6.83	1064	
1650	15.0	8.89	68.0	30.49	6.80	1056	
1654	15.5	8.89	53.6	30.47	6.82	1045	
~~1704~~ 1658	16.0	8.89	30.5	30.34	6.91	1037	
~~1708~~ 1702	16.5	8.89	17.6	30.36	6.81	1035	
~~1711~~ 1706	~~16.75~~ 17.0	8.89	11.5	30.33	6.80	1031	Stop to dump bucket, check weather
1718	~~17.00~~ 17.5	8.89	4.96	30.32	6.80	1036	
1722	18.0	8.89	4.11	30.33	6.81	1035	
1726	18.5	8.89	3.36	30.34	6.83	1035	

08/21/12

Sampler Signature: D. Whitaker — Date: 08/21/12

Appendix B
Data Validation Summary Reports

Data Validation Summary Katahdin SDG SF5750

Data Validation Summary

NAPR, SWMU 75

TO: Mike Zamboni/WDC

Anita Dodson/VBO

FROM: Tiffany McGlynn/GNV

CC: Herb Kelly/GNV

DATE: November 30, 2012

Introduction

The following data validation report discusses the data validation process and findings for Katahdin Analytical, for SDG SF5750.

Samples were analyzed using the following analytical methods:

- SW6010B Lead, total and dissolved
- SW8270C_SIM Semivolatiles

The samples included in this SDG are listed in the table below.

Sample Name	Matrix
NAPR-W75-GW02-0812	Water
NAPR-W75-GW05-0812	Water
NAPR-W75-GW05P-0812	Water
NAPR-W75-GW03-0812	Water
NAPR-W75-EB-082712	Water
NAPR-W75-GW04-0812	Water
NAPR-W75-EB-082812	Water

Data Evaluation

Data was evaluated in accordance with the analytical methods and with the criteria found in the following guidance documents: Resource Conservation and Recovery Act Facility Investigation Sampling and Analysis Plan Solid Waste Management Unit 75 Naval Activity Puerto Rico

Ceiba, Puerto Rico Contract Task Order JM05 (June 2012), and Region III Modifications for Organic Data Review (EPA 1994, as applicable. The samples were evaluated based on the following criteria:

- Data Completeness
- Technical Holding Times
- Instrument Tuning
- Initial/Continuing Calibrations
- Blanks
- Internal Standards
- Laboratory Control Samples
- Matrix Spike Recoveries
- Surrogate Recoveries
- Field Duplicates
- Identification/Quantitation
- Reporting Limits

Overall Evaluation of Data/Potential Usability Issues

Specific details regarding qualification of the data are addressed in the sections below. 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 qualified these data accordingly.

Data Completeness

The SDG was received complete and intact.

Technical Holding Times

According to the chain of custody records, sampling was performed on 8/27/12 and 8/28/12. Samples were received at the laboratory on 8/29/12. All sample preparation and analyses were performed within holding time requirements.

Lab Control Sample/Sample Duplicate

Anthracene and fluoranthene exhibited recoveries below the lower limits in the LCS/LCSD. Affected data are summarized in **Attachment 1**.

Calibration

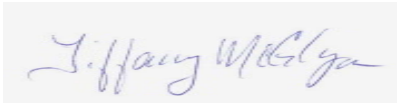
Benzo(b)fluoranthene and benzo(a)anthracene did not meet criteria for second source calibration. Affected data are summarized in **Attachment 1**.

Conclusion

These data can be used in the project decision-making process as qualified by the data quality evaluation process.

Please do not hesitate to contact us about this validation report.

Sincerely,



Tiffany McGlynn

Qualification Flags

Exclude	More appropriate data exist for this analyte.
R	Data were rejected for use.
UL	Analyte not detected, quantitation limit is potentially biased low.
UJ	Analyte not detected, estimated quantitation limit.
U	Analyte not detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
L	Analyte present, estimated value potentially biased low.
K	Analyte present, estimated value potentially biased high.
N	Analyte identification presumptive; no second column analysis performed or GC/MS tentative identification.
J	Analyte present, estimated value.
NJ	Analysis indicates the presence of an analyte that was "tentatively identified" and the associated value represents its approximate concentration.
None	Placeholder for calculating quality control issues that do not require flagging.
=	Analyte was detected at a concentration greater than the quantitation limit.

Qualifier Code Reference

Value	Description
%SOL	High Moisture content
2C	Second Column – Poor Dual Column Reproducibility
2S	Second Source – Bad reproducibility between tandem detectors
BD	Blank Spike/Blank Spike Duplicate(LCS/LCSD) Precision
BRL	Below Reporting Limit
BSH	Blank Spike/LCS – High Recovery
BSL	Blank Spike/LCS – Low Recovery
CC	Continuing Calibration
CCBL	Continuing Calibration Blank Contamination
CCH	Continuing Calibration Verification – High Recovery
CCL	Continuing Calibration Verification – Low Recovery
DL	Redundant Result – due to Dilution
EBL	Equipment Blank Contamination
EMPC	Estimated Possible Maximum Concentration
ESH	Extraction Standard - High Recovery
ESL	Extraction Standard - Low Recovery
FBL	Field Blank Contamination
FD	Field Duplicate
HT	Holding Time
ICB	Initial Calibration – Bad Linearity or Curve Function
ICH	Initial Calibration – High Relative Response Factors
ICL	Initial Calibration – Low Relative Response Factors
IR15	Ion ratio exceeds +/- 15% difference
ISH	Internal Standard – High Recovery
ISL	Internal Standard – Low Recovery
LD	Lab Duplicate Reproducibility
LR	Concentration Exceeds Linear Range
MBL	Method Blank Contamination
MDP	Matrix Spike/Matrix Spike Duplicate Precision
MI	Matrix interference obscuring the raw data

Value	Description
MSH	Matrix Spike and/or Matrix Spike Duplicate – High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate – Low Recovery
OT	Other
PD	Pesticide Degradation
RE	Redundant Result - due to Reanalysis or Re-extraction
SD	Serial Dilution Reproducibility
SSH	Spiked Surrogate – High Recovery
SSL	Spiked Surrogate – Low Recovery
TBL	Trip Blank Contamination
TN	Tune

NAPR, SWMU 75
Attachment 1 Change Qual. Table
SDG SF5750

Sample ID	Compound	Q Flag	Qual Code
NAPR-W75-GW02-0812	Anthracene	UJ	BSL
NAPR-W75-GW02-0812	Benzo(a)anthracene	UJ	2S
NAPR-W75-GW02-0812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-GW02-0812	Fluoranthene	UJ	BSL
NAPR-W75-GW04-0812	Anthracene	UJ	BSL
NAPR-W75-GW04-0812	Benzo(a)anthracene	UJ	2S
NAPR-W75-GW04-0812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-GW04-0812	Fluoranthene	UJ	BSL
NAPR-W75-EB-082812	Anthracene	UJ	BSL
NAPR-W75-EB-082812	Benzo(a)anthracene	UJ	2S
NAPR-W75-EB-082812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-EB-082812	Fluoranthene	UJ	BSL
NAPR-W75-GW05-0812	Anthracene	UJ	BSL
NAPR-W75-GW05-0812	Benzo(a)anthracene	UJ	2S
NAPR-W75-GW05-0812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-GW05-0812	Fluoranthene	UJ	BSL
NAPR-W75-GW05P-0812	Anthracene	UJ	BSL
NAPR-W75-GW05P-0812	Benzo(a)anthracene	UJ	2S
NAPR-W75-GW05P-0812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-GW05P-0812	Fluoranthene	UJ	BSL
NAPR-W75-GW03-0812	Anthracene	UJ	BSL
NAPR-W75-GW03-0812	Benzo(a)anthracene	UJ	2S
NAPR-W75-GW03-0812	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-GW03-0812	Fluoranthene	J	BSL
NAPR-W75-EB-082712	Anthracene	UJ	BSL
NAPR-W75-EB-082712	Benzo(a)anthracene	UJ	2S
NAPR-W75-EB-082712	Benzo(b)fluoranthene	UJ	2S
NAPR-W75-EB-082712	Fluoranthene	UJ	BSL

Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-1
Client ID: NAPR-W75-GW02-0812
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5760.D

Sample Date: 27-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 13-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.097	ug/L	1	.2	0.19	0.062	0.097
2-Methylnaphthalene	U	0.097	ug/L	1	.2	0.19	0.075	0.097
Acenaphthylene	U	0.097	ug/L	1	.2	0.19	0.052	0.097
Acenaphthene	U	0.097	ug/L	1	.2	0.19	0.062	0.097
Fluorene	U	0.097	ug/L	1	.2	0.19	0.059	0.097
Phenanthrene	U	0.097	ug/L	1	.2	0.19	0.050	0.097
Anthracene	UL	0.097	ug/L	1	.2	0.19	0.043	0.097
Fluoranthene	ULL	0.097	ug/L	1	.2	0.19	0.071	0.097
Pyrene	U	0.097	ug/L	1	.2	0.19	0.057	0.097
Benzo(a)anthracene	ULL	0.097	ug/L	1	.2	0.19	0.045	0.097
Chrysene	ULL	0.097	ug/L	1	.2	0.19	0.035	0.097
Benzo(b)Fluoranthene	UL	0.097	ug/L	1	.2	0.19	0.086	0.097
Benzo(k)fluoranthene	U	0.097	ug/L	1	.2	0.19	0.048	0.097
Benzo(a)pyrene	U	0.097	ug/L	1	.2	0.19	0.064	0.097
Indeno(1,2,3-cd)pyrene	U	0.097	ug/L	1	.2	0.19	0.050	0.097
Dibenzo(a,h)anthracene	U	0.097	ug/L	1	.2	0.19	0.068	0.097
Benzo(g,h,i)perylene	U	0.097	ug/L	1	.2	0.19	0.063	0.097
2-Methylnaphthalene-D10		61.2	%					
Fluorene-D10		53.1	%					
pyrene-d10		90.2	%					

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HK 11/30/2012

Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-3
Client ID: NAPR-W75-GW05-0812
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5761.D

Sample Date: 27-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 13-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.094	ug/L	1	.2	0.19	0.060	0.094
2-Methylnaphthalene	U	0.094	ug/L	1	.2	0.19	0.073	0.094
Acenaphthylene	U	0.094	ug/L	1	.2	0.19	0.051	0.094
Acenaphthene	U	0.094	ug/L	1	.2	0.19	0.060	0.094
Fluorene	U	0.094	ug/L	1	.2	0.19	0.058	0.094
Phenanthrene	U	0.094	ug/L	1	.2	0.19	0.048	0.094
Anthracene	UL	0.094	ug/L	1	.2	0.19	0.042	0.094
Fluoranthene	ULL	0.094	ug/L	1	.2	0.19	0.069	0.094
Pyrene	U	0.094	ug/L	1	.2	0.19	0.056	0.094
Benzo(a)anthracene	ULL	0.094	ug/L	1	.2	0.19	0.043	0.094
Chrysene	ULL	0.094	ug/L	1	.2	0.19	0.034	0.094
Benzo(b)Fluoranthene	UL	0.094	ug/L	1	.2	0.19	0.084	0.094
Benzo(k)fluoranthene	U	0.094	ug/L	1	.2	0.19	0.046	0.094
Benzo(a)pyrene	U	0.094	ug/L	1	.2	0.19	0.062	0.094
Indeno(1,2,3-cd)pyrene	U	0.094	ug/L	1	.2	0.19	0.049	0.094
Dibenzo(a,h)anthracene	U	0.094	ug/L	1	.2	0.19	0.066	0.094
Benzo(g,h,i)perylene	U	0.094	ug/L	1	.2	0.19	0.061	0.094
2-Methylnaphthalene-D10		55.8	%					
Fluorene-D10		52.9	%					
pyrene-d10		83.6	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-5
Client ID: NAPR-W75-GW05P-081
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5762.D

Sample Date: 27-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 18-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene	U	0.096	ug/L	1	.2	0.19	0.074	0.096
Acenaphthylene	U	0.096	ug/L	1	.2	0.19	0.052	0.096
Acenaphthene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
Fluorene	U	0.096	ug/L	1	.2	0.19	0.059	0.096
Phenanthrene	U	0.096	ug/L	1	.2	0.19	0.049	0.096
Anthracene	UL	0.096	ug/L	1	.2	0.19	0.042	0.096
Fluoranthene	ULL	0.096	ug/L	1	.2	0.19	0.070	0.096
Pyrene	U	0.096	ug/L	1	.2	0.19	0.057	0.096
Benzo(a)anthracene	ULL	0.096	ug/L	1	.2	0.19	0.044	0.096
Chrysene	ULL	0.096	ug/L	1	.2	0.19	0.035	0.096
Benzo(b)Fluoranthene	U	0.096	ug/L	1	.2	0.19	0.086	0.096
Benzo(k)fluoranthene	U	0.096	ug/L	1	.2	0.19	0.047	0.096
Benzo(a)pyrene	U	0.096	ug/L	1	.2	0.19	0.063	0.096
Indeno(1,2,3-cd)pyrene	U	0.096	ug/L	1	.2	0.19	0.050	0.096
Dibenzo(a,h)anthracene	U	0.096	ug/L	1	.2	0.19	0.067	0.096
Benzo(g,h,i)perylene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene-D10		58.5	%					
Fluorene-D10		57.1	%					
pyrene-d10		87.9	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-7
Client ID: NAPR-W75-GW03-0812
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5763.D

Sample Date: 27-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 18-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.097	ug/L	1	.2	0.19	0.062	0.097
2-Methylnaphthalene	U	0.097	ug/L	1	.2	0.19	0.075	0.097
Acenaphthylene	U	0.097	ug/L	1	.2	0.19	0.052	0.097
Acenaphthene		0.50	ug/L	1	.2	0.19	0.062	0.097
Fluorene	U	0.097	ug/L	1	.2	0.19	0.059	0.097
Phenanthrene	U	0.097	ug/L	1	.2	0.19	0.050	0.097
Anthracene	UL	0.097	ug/L	1	.2	0.19	0.043	0.097
Fluoranthene	LL	1.5	ug/L	1	.2	0.19	0.071	0.097
Pyrene		1.4	ug/L	1	.2	0.19	0.057	0.097
Benzo(a)anthracene	ULL	0.097	ug/L	1	.2	0.19	0.045	0.097
Chrysene	ULL	0.097	ug/L	1	.2	0.19	0.035	0.097
Benzo(b)Fluoranthene	UL	0.097	ug/L	1	.2	0.19	0.086	0.097
Benzo(k)fluoranthene	U	0.097	ug/L	1	.2	0.19	0.048	0.097
Benzo(a)pyrene	U	0.097	ug/L	1	.2	0.19	0.064	0.097
Indeno(1,2,3-cd)pyrene	U	0.097	ug/L	1	.2	0.19	0.050	0.097
Dibenzo(a,h)anthracene	U	0.097	ug/L	1	.2	0.19	0.068	0.097
Benzo(g,h,i)perylene	U	0.097	ug/L	1	.2	0.19	0.063	0.097
2-Methylnaphthalene-D10		43.3	%					
Fluorene-D10		36.5	%					
pyrene-d10		74.0	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-9
Client ID: NAPR-W75-EB-082712
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5764.D

Sample Date: 27-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 13-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
2-Methylnaphthalene	U	0.098	ug/L	1	.2	0.20	0.075	0.098
Acenaphthylene	U	0.098	ug/L	1	.2	0.20	0.053	0.098
Acenaphthene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
Fluorene	U	0.098	ug/L	1	.2	0.20	0.060	0.098
Phenanthrene	U	0.098	ug/L	1	.2	0.20	0.050	0.098
Anthracene	UL	0.098	ug/L	1	.2	0.20	0.043	0.098
Fluoranthene	ULL	0.098	ug/L	1	.2	0.20	0.072	0.098
Pyrene	U	0.098	ug/L	1	.2	0.20	0.058	0.098
Benzo(a)anthracene	ULL	0.098	ug/L	1	.2	0.20	0.045	0.098
Chrysene	ULL	0.098	ug/L	1	.2	0.20	0.035	0.098
Benzo(b)Fluoranthene	UL	0.098	ug/L	1	.2	0.20	0.087	0.098
Benzo(k)fluoranthene	U	0.098	ug/L	1	.2	0.20	0.048	0.098
Benzo(a)pyrene	U	0.098	ug/L	1	.2	0.20	0.065	0.098
Indeno(1,2,3-cd)pyrene	U	0.098	ug/L	1	.2	0.20	0.051	0.098
Dibenzo(a,h)anthracene	U	0.098	ug/L	1	.2	0.20	0.069	0.098
Benzo(g,h,i)perylene	U	0.098	ug/L	1	.2	0.20	0.064	0.098
2-Methylnaphthalene-D10		57.9	%					
Fluorene-D10		54.0	%					
pyrene-d10		88.7	%					

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HK 11/30/2012

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-11
Client ID: NAPR-W75-GW04-0812
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5765.D

Sample Date: 28-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 13-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	UM	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene	UM	0.096	ug/L	1	.2	0.19	0.074	0.096
Acenaphthylene	UM	0.096	ug/L	1	.2	0.19	0.052	0.096
Acenaphthene	UM	0.096	ug/L	1	.2	0.19	0.062	0.096
Fluorene	UM	0.096	ug/L	1	.2	0.19	0.059	0.096
Phenanthrene	UM	0.096	ug/L	1	.2	0.19	0.049	0.096
Anthracene	ULMM	0.096	ug/L	1	.2	0.19	0.042	0.096
Fluoranthene	ULLMM	0.096	ug/L	1	.2	0.19	0.070	0.096
Pyrene	UM	0.096	ug/L	1	.2	0.19	0.057	0.096
Benzo(a)anthracene	ULLMM	0.096	ug/L	1	.2	0.19	0.044	0.096
Chrysene	ULLM	0.096	ug/L	1	.2	0.19	0.035	0.096
Benzo(b)Fluoranthene	ULM	0.096	ug/L	1	.2	0.19	0.086	0.096
Benzo(k)fluoranthene	UM	0.096	ug/L	1	.2	0.19	0.047	0.096
Benzo(a)pyrene	UM	0.096	ug/L	1	.2	0.19	0.063	0.096
Indeno(1,2,3-cd)pyrene	UM	0.096	ug/L	1	.2	0.19	0.050	0.096
Dibenzo(a,h)anthracene	UM	0.096	ug/L	1	.2	0.19	0.067	0.096
Benzo(g,h,i)perylene	UM	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene-D10		62.5	%					
Fluorene-D10		54.1	%					
pyrene-d10		86.3	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SF5750-13
Client ID: NAPR-W75-EB-082812
Project: CTO-JM05 NAPR SWMU 75
SDG: SF5750
Lab File ID: N5768.D

Sample Date: 28-AUG-12
Received Date: 29-AUG-12
Extract Date: 30-AUG-12
Extracted By: WAS
Extraction Method: SW846 3510
Lab Prep Batch: WG112847

Analysis Date: 07-SEP-12
Analyst: WAS
Analysis Method: SW846 M8270D
Matrix: AQ
% Solids: NA
Report Date: 13-SEP-12

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene	U	0.096	ug/L	1	.2	0.19	0.074	0.096
Acenaphthylene	U	0.096	ug/L	1	.2	0.19	0.052	0.096
Acenaphthene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
Fluorene	U	0.096	ug/L	1	.2	0.19	0.059	0.096
Phenanthrene	U	0.096	ug/L	1	.2	0.19	0.049	0.096
Anthracene	UL	0.096	ug/L	1	.2	0.19	0.042	0.096
Fluoranthene	ULL	0.096	ug/L	1	.2	0.19	0.070	0.096
Pyrene	U	0.096	ug/L	1	.2	0.19	0.057	0.096
Benzo(a)anthracene	ULL	0.096	ug/L	1	.2	0.19	0.044	0.096
Chrysene	ULL	0.096	ug/L	1	.2	0.19	0.035	0.096
Benzo(b)Fluoranthene	UL	0.096	ug/L	1	.2	0.19	0.086	0.096
Benzo(k)fluoranthene	U	0.096	ug/L	1	.2	0.19	0.047	0.096
Benzo(a)pyrene	U	0.096	ug/L	1	.2	0.19	0.063	0.096
Indeno(1,2,3-cd)pyrene	U	0.096	ug/L	1	.2	0.19	0.050	0.096
Dibenzo(a,h)anthracene	U	0.096	ug/L	1	.2	0.19	0.067	0.096
Benzo(g,h,i)perylene	U	0.096	ug/L	1	.2	0.19	0.062	0.096
2-Methylnaphthalene-D10		54.7	%					
Fluorene-D10		54.0	%					
pyrene-d10		92.6	%					

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INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW02-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-001

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW02-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-002

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W75-GW05-0812

Matrix: WATER **SDG Name:** SF5750

Percent Solids: 0.00 **Lab Sample ID:** SF5750-003

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW05-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-004

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

HK 11/30/2012

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW05P-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-005

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW05P-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-006

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W75-GW03-0812

Matrix: WATER **SDG Name:** SF5750

Percent Solids: 0.00 **Lab Sample ID:** SF5750-007

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W75-GW03-0812

Matrix: WATER **SDG Name:** SF5750

Percent Solids: 0.00 **Lab Sample ID:** SF5750-008

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-EB-082712
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-009

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

FORM I - IN

HK 11/30/2012

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-EB-082712
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-010

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

HK 11/30/2012

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-GW04-0812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-011

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

HK 11/30/2012

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W75-GW04-0812

Matrix: WATER **SDG Name:** SF5750

Percent Solids: 0.00 **Lab Sample ID:** SF5750-012

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: NAPR-W75-EB-082812
Matrix: WATER
SDG Name: SF5750
Percent Solids: 0.00
Lab Sample ID: SF5750-013

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, TOTAL	4.0	U		P	1	5.0	1.07	4.0

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W75-EB-082812

Matrix: WATER **SDG Name:** SF5750

Percent Solids: 0.00 **Lab Sample ID:** SF5750-014

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD
7439-92-1	LEAD, DISSOLVED	4.0	U		P	1	5.0	1.07	4.0

Comments:

HK 11/30/2012

US EPA
Hazardous Waste Support Branch
Validating Semivolatile Organic Compounds
By Gas Chromatography/Mass Spectrometry
SW-846 Method 8270D

Prepared by: George Karras Date: 8/22/08
George Karras, Chemist
Hazardous Waste Support Section

Prepared by Russell Arnone Date: 8/22/08
Russell Arnone
Hazardous Waste Support

Concurred by: Linda M. Mauel Date: 8/26/08
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: Robert Runyon Date: 8/26/08
Robert Runyon, Chief
Hazardous Waste Support Branch

Annual Review

Reviewed by: Russell Arnone Date: 08/11/09
Name

Reviewed by: _____ Date: _____
Name

TABLE OF CONTENTS

YES NO N/A

INTRODUCTION

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to "SW846-Method 8270D" January 1998. Method 8270D is used to determine the concentration of semivolatile organic compounds in extracts prepared from many types of solid waste matrices, soils, air sampling media and water samples. The validation methods and actions discussed in this document are based on the requirements set forth in SW846 Method 8270D, Method 8000C and the "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," January 2005. This document covers technical problems specific to each fraction and sample matrix; however, situations may arise where data limitations must be assessed based on the reviewer's professional judgement.

Summary of Method

To ensure a thorough evaluation of each result in a data case, the reviewer must complete the checklist within this SOP, answering specific questions while performing the prescribed "ACTIONS" in each section. Qualifiers (or flags) are applied to questionable or unusable results as instructed. The data qualifiers discussed in this document are defined on page 5.

The reviewer must prepare a detailed data assessment to be submitted along with the completed SOP checklist. The Data Assessment must list all data qualifications, reasons for qualifications, instances of missing data and contract non-compliance.

Reviewer Qualifications

Data reviewers must possess a working knowledge of SW846 Analytical Methods and National Functional Guidelines mentioned above.

YES NO N/A

DEFINITIONS

Acronyms

BNA - base neutral acid(another name for Semi Volatiles)
CLP - Contract Laboratory Program
CRQL - Contract Required Quantitation Limit
%D - percent difference
DCB -decachlorobiphenyl
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenylethane
DDT - dichlorodiphenyltrichloroethane
DoC - Date of Collection
GC - gas chromatography
GC/ECD - gas chromatograph/electron capture detector
GC/MS - gas chromatograph/mass spectrometer
GPC - gel permeation chromatography
IS - internal standard
kg - kilogram
µg - microgram
MS - matrix spike
MSD - matrix spike duplicate
ℓ - liter
mℓ - milliliter
PCB - Polychlorinated biphenyl
PE - performance evaluation
PEM - Performance Evaluation Mixture
QC - quality control
RAS - Routine Analytical Services
RIC - reconstructed ion chromatogram
RPD - relative percent difference
RRF - relative response factor
RRF - average relative response factor (from initial calibration)
RRT - relative retention time
RSD - relative standard deviation
RT - retention time
RSCC - Regional Sample Control Center
SDG - sample delivery group
SMC - system monitoring compound
SOP - standard operating procedure
SOW - Statement of Work
SVOA - semivolatile organic acid
TCL - Target Compound List
TCLP - Toxicity Characteristics Leachate Procedure

YES NO N/A

TCX -tetrachloro-m-xylene
TIC - tentatively identified compound
TOPO - Task Order Project Officer
TPO - Technical Project Officer
VOA - Volatile organic
VTSR - Validated Time of Sample Receipt

Data Qualifiers

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."

JN - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

LAB QUALIFIERS:

D - The positive value is the result of an analysis at a secondary dilution factor.

B - The analyte is present in the associated method blank as well as in the sample. This qualifier has a different meaning when validating inorganic data.

YES NO N/A

E - The concentration of this analyte exceeds the calibration range of the instrument.

A - Indicates a Tentatively Identified Compound (TIC) is a suspected adol-condensation product.

X,Y,Z- Laboratory defined flags. The data reviewer must change these qualifiers during validation so that the data user may understand their impact on the data.

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER:_____ LAB:_____

SITE NAME:_____

1.0 Data Completeness and Deliverables

1.1 Has all data been submitted in CLP deliverable format? [ ] ___ ___

ACTION: If not, note the effect on review of the data in the data assessment narrative.

2.0 Cover Letter, SDG Narrative

2.1 Is a laboratory narrative or cover letter present? [ ] ___ ___

2.2 Are case number and SDG number(s) contained in the narrative or cover letter? [ ] ___ ___

YES NO N/A

II. SEMIVOLATILE ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Report Forms present for all samples? [ ] ___ ___

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? ___ [ ] ___

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50%-90% water, all data should be flagged as estimated ("J"). If a soil sample, other than TCLP, contains more than 90% water, all non-detects data are qualified as unusable (R), and detects are flagged "J".

ACTION: If samples were not iced, or if the ice was melted upon arrival at the laboratory and the cooler temperature was elevated (10°C), flag all positive results "J" and all non-detects "UJ".

2.0 Holding Times

2.1 Have any semivolatile technical holding times, determined from date of collection to date of extraction, been exceeded? ___ [ ] ___

Continuous extraction of water samples for semivolatile analysis must be started within **7** days of the date of collection. Soil/sediment samples must be extracted within **14** days of collection. Extracts must be analyzed within

YES NO N/A

40 days of the date of extraction.

Table of Holding Time Violations

(See Traffic Report)

Sample ID	Sample Matrix	Date Sampled	Date Lab Received	Date Extracted	Date Analyzed

ACTION: If technical holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all results should be qualified "J", but the reviewer may determine that non-detect data are unusable ("R"). If holding times are exceeded by more than 28 days, all non-detect data are unusable (R).

	YES	NO	N/A

3.0 Surrogate Recovery (Form II/Equivalent)

3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:

a. Low Water [ ] ___ ___

b. Low/Med Soil [ ] ___ ___

3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:

a. Low Water [ ] ___ ___

b. Low/Med Soil [ ] ___ ___

ACTION: If CLP deliverables are unavailable, document the effect(s) in data assessments. In some cases the lab may have to be contacted to obtain the data necessary to complete the validation.

3.3 Were outliers marked correctly with an asterisk? [ ] ___ ___

ACTION: Circle all outliers in red.

3.4 Were two or more base neutral OR acid surrogate recoveries out of specification for any sample or method blank (Reviewer should use lab in house recovery limits. Use surrogate recovery limits from USEPA National Functional Guidlines January 2005 page 130, if in house limits are not available. See Method 8000B-43 or 80000C-24). [ ] ___ ___

Note: Examine lab in house limits for reasonableness.

If yes, were samples re-analyzed? [ ] ___ ___

	YES	NO	N/A
Were method blanks re-analyzed?	[ ]	___	___

ACTION: If all surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet method specifications, <u>for the affected fraction only (i.e. either base-neutral or acid compounds):</u>

1. Flag all positive results as estimated ("J").

2. Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.

3. If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral <u>or</u> acid surrogate has a recovery of < 10%:

1. Positive results for the fraction with < 10% surrogate recovery are qualified with "J".

2. Non-detects for that fraction should be qualified as unusable (R) .

NOTE: Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and reanalyses. Check the internal standard areas.

3.5 Are there any transcription/calculation errors between raw data and Form II?	___	[ ]	___

ACTION: If large errors exist, call lab for explanation/resubmittal, make any necessary corrections and document

YES NO N/A

effect in data assessments.

4.0 Matrix Spikes (Form III/Equivalent)

4.1 Have the semivolatile Matrix Spike and Matrix Spike Duplicate/or duplicate unspiked Sample recoveries been listed on the Recovery Form (Form III)? [ ] ___ ___

NOTE: Method 3500B/page 4 states the spiking compounds:

Base/neutrals	Acids
1,2,4-Trichlorobenzene	Pentachlorophenol
Acenaphthene	Phenol
2,4-Dinitrotoluene	2-Chlorophenol
Pyrene	4-Chloro-3-methylphenol
N-Nitroso-di-n-propylamine	4-Nitrophenol
1,4-Dichlorobenzene	

Note: Some projects may require the spiking of specific compounds of interest.

Note: See Method 8270D-sec 8.4.2 for deciding on whether to prepare and analyze duplicate samples or a martix spike/matrix spike duplicate. If samples are expected to contain target analytes, then laboratory may use one matrix spike and a duplicate analysis of an unspiked field sample. If samples are not expected to contain target analytes, laboratory should use a matrix spike and matrix spike duplicate pair.

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

a. Low Water [ ] ___ ___

b. Low Solid [ ] ___ ___

c. Med Solid [ ] ___ ___

YES NO N/A

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above. It may be necessary to contact the lab to obtain the required data.

NOTE: If the data has not been reported on CLP equivalent form, then the laboratory must provide the information necessary to evaluate the spike recoveries in the MS and MSD. The required data which should have been provided by the lab include the analytes and concentrations used for spiking, background concentrations of the spiked analytes (i.e., concentrations in unspiked sample), methods and equations used to calculate the QC acceptance criteria for the spiked analytes, percent recovery data for all spiked analytes.

The data reviewer must verify that all reported equations and percent recoveries are correct before proceeding to the next section.

4.3 Were matrix spikes performed at concentration equal to 100ug/L for acid compounds, and 200ug/l for base compounds (Method 3500B-4), or those specified in project plan. [ ] ___ ___

4.4 How many semivolatile spike recoveries are outside Laboratory in house MS/MSD recovery limits (use recovery limits values in Method 8270D-43&44 Table 6 if in house values not available).

Water	Solids
____ out of ____	____ out of ____

YES NO N/A

4.5 How many RPD's for matrix spike and matrix spike duplicate recoveries are outside QC limits?

Water	Solids
____ out of ____	____ out of ____

ACTION: Circle all outliers with red pencil.

ACTION: No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the matrix spike and matrix spike duplicate results in conjunction with other QC criteria to determine the need for some qualification of the data.

4.6 Was a Laboratory Control Sample (LCS) analyzed with each analytical batch? [ ] ___ ___

NOTE: When the results of the matrix spike analysis indicate a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

5.0 Blanks (Form IV/Equivalent)

5.1 Is the Method Blank Summary (Form IV) present? [ ] ___ ___

5.2 Frequency of Analysis:

Has a reagent/method blank analysis been reported per 20 samples of similar matrix, or concentration level, and for each extraction batch? [ ] ___ ___

5.3 Has a method blank been analyzed either after

	YES	NO	N/A
the calibration standard or at any other time during the analytical shift for each GC/MS system used ?	[ ]	___	___

ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If not available, use professional judgement to determine if the associated sample data should be qualified.

5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.

	YES	NO	N/A
Is the chromatographic performance (baseline stability) for each instrument acceptable for the semivolatiles?	[ ]	___	___

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks", "drill blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify the data. Do not confuse them with the other QC blanks discussed below.

	YES	NO	N/A
6.1 Do any method/instrument/reagent blanks have positive results for target analytes and/or TICs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for percent moisture where necessary.	___	[ ]	___
6.2 Do any field/rinse/ blanks have positive results for target analytes and/or TICs (if required, see section 10 below)?	___	[ ]	___

YES NO N/A

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case) must be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field Blanks must be qualified for outlying surrogates, poor spectra, instrument performance or calibration QC problems.

ACTION: Follow the directions in the table below to qualify sample results due to contamination. Use the largest value from all the associated blanks. If gross contamination exists, all data in the associated samples should be qualified as unusable (R).

YES NO N/A

Blank Action for Semivolatile Analyses

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Field	Detects	Not detected	No qualification required
	< CRQL *	< CRQL	Report CRQL value with a U
		≥ CRQL	No qualification required
	= CRQL *	< CRQL	Report CRQL value with a U
		≥ CRQL	No qualification required
	> CRQL *	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report concentration of sample with a U
		≥ CRQL and ≥ blank contamination	No qualification required

NOTE: Analytes qualified "U" for blank contamination are still considered as "hits" when qualifying for calibration criteria.

NOTE: If the laboratory did not report TIC analyses, check the project plans to verify whether or not it was required.

6.3 Are there field/rinse/equipment blanks associated with every sample? [ ] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

6.4 Was a instrument blank analyzed after each sample/dilution which contained a target compound

	YES	NO	N/A
that exceeded the initial calibration range.	[ ]	___	___
6.5 Does the instrument blank have positive results for target analytes and/or TICs?	___	[ ]	___

Note: Use professional judgement to determine if carryover occurred and qualify analytes accordingly.

7.0 GC/MS Apparatus and Materials

	YES	NO	N/A
7.1 Did the lab use the proper gas chromatographic column for analysis of semivolatiles by Method 8270D? Check raw data, instrument logs or contact the lab to determine what type of column was used. The method requires the use of 30 m x 0.25 mm ID (or 0.32 mm ID), silicone-coated, fused silica, capillary column.	[ ]	___	___

ACTION: If the specified column, or equivalent, was not used, document the effects in the data assessment. Use professional judgement to determine the acceptability of the data.

8.0 GC/MS Instrument Performance Check (Form V/Equivalent)

	YES	NO	N/A
8.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)?	[ ]	___	___

NOTE: The performance solution should also contain 4,4-DDT, pentachlorophenol, and benzidine to verify injection port inertness and column performance. The degradation of DDT to DDE and DDD must be less than 20% total and the response of pentachlorophenol and benzidine should be within normal ranges for these compounds (based upon lab experience) and show no peak degradation or tailing before samples are analyzed. (see section 5.5

YES NO N/A

page 8270D-12).

8.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [ ] ___ ___

8.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument? [ ] ___ ___

ACTION: List date, time, instrument ID, and sample analyses for which no associated GC/MS tuning data are available.

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

ACTION: If lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

ACTION: If mass assignment is in error, flag all associated sample data as unusable (R).

8.4 Have the ion abundances been normalized to m/z 198? [ ] ___ ___

8.5 Have the ion abundance criteria been met for each instrument used? [ ] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

	YES	NO	N/A
ACTION: If ion abundance criteria are not met, take action specified in section 3.2			
8.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.)	___	[ ]	___
8.7 Have the appropriate number of significant figures (two) been reported?	[ ]	___	___
ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.			
8.8 Are the spectra of the mass calibration compound acceptable?	[ ]	___	___
ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.			
9.0 Target Analytes			
9.1 Are the Organic Analysis Data Sheets (Form I) present with required header information on each page, for each of the following:			
a. Samples and/or fractions as appropriate	[ ]	___	___
b. Matrix spikes and matrix spike duplicates	[ ]	___	___
c. Blanks	[ ]	___	___
9.2 Has any special cleanup, such as GPC, been performed on all soil/sediment sample extracts (see section 7.2, page 8270D-14)?	[ ]	___	___

	YES	NO	N/A

ACTION: If data suggests that extract cleanup was not performed, use professional judgement. Make note in the data assessment narrative.

9.3 Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?

a. Samples and/or fractions as appropriate	[ ]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[ ]	___	___
c. Blanks	[ ]	___	___

ACTION: If any data are missing, take action specified in 3.2 above.

9.4 Are the response factors shown in the Quant Report?	[ ]	___	___

9.5 Is chromatographic performance acceptable with respect to:

Baseline stability?	[ ]	___	___
Resolution?	[ ]	___	___
Peak shape?	[ ]	___	___
Full-scale graph (attenuation)?	[ ]	___	___
Other:_____	[ ]	___	___

ACTION: Use professional judgement to determine the acceptability of the data.

9.6 Are the lab-generated standard mass spectra of identified semivolatile compounds present for

	YES	NO	N/A
each sample?	[ ]	___	___

ACTION: If any mass spectra are missing, take action specified in 3.2 above. If the lab does not generate their own standard spectra, make a note in the data assessment narrative. If spectra are missing, reject all positive data.

9.7 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	[ ]	___	___
9.8 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum?	[ ]	___	___
9.9 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum?	[ ]	___	___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected (R), flagged "N" (Presumptive evidence of the presence of the compound) or changed to not detected (U) at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 9.7, 9.8, and 9.9.

ACTION: When sample carry-over is a possibility, professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification.

	YES	NO	N/A

10.0 Tentatively Identified Compounds (TIC)

10.1 If Tentatively Identified Compounds were required for this project, are all Form Is, Part B present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier?

NOTE: Review sampling reports to determine if the lab was required to identify non target analytes (refer to section 7.6.2,page 8270D-21).

10.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following: [ ] ___ ___

a. Samples and/or fractions as appropriate [ ] ___ ___

b. Blanks [ ] ___ ___

ACTION: If any TIC data are missing, take action specified in 3.2 above.

ACTION: Add "JN" qualifier only to analytes identified by CAS #.

10.3 Are any target compounds from one fraction listed as TIC compounds in another (e.g., an acid compound listed as a base neutral TIC)? ___ [ ] ___

ACTION: i. Flag with "R" any target compound listed as a TIC.

ii. Make sure all rejected compounds are properly reported in the other fraction.

10.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% (of the most abundant ion) also present in the

	YES	NO	N/A
sample mass spectrum?	[ ]	___	___
10.5 Do TIC and "best match" standard relative ion intensities agree within ± 20%?	[ ]	___	___

ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change the identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate and remove "JN". Also, when a compound is not found in any blank, but is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable, "R."

11.0 Compound Quantitation and Reported Detection Limits

11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	[ ]	___

NOTE: Structural isomers with similar mass spectra, but insufficient GC resolution (i.e. percent valley between the two peaks > 25%) should be reported as isomeric pairs. The reviewer should check the raw data to ensure that all such isomers were included in the quantitation (i.e., add the areas of the two coeluting peaks to calculate the total concentration).

11.2 Are the method detection limits adjusted to reflect sample dilutions and, for soils, sample moisture?	[ ]	___	___

YES NO N/A

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

ACTION: When a sample is analyzed at more than one dilution, the lowest detection limits are used (unless a QC exceedance dictates the use of the higher detection limit from the diluted sample data). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and it's associated value on the original Form I (if present) and substituting the data from the analysis of the diluted sample. Specify which Form I is to be used, then draw a red " X" across the entire page of all Form I's that should not be used, including any in the summary package.

12.0 Standards Data (GC/MS)

12.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant, Reports) present for initial and continuing calibration? [ ] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

13.0 GC/MS Initial Calibration (Form VI/Equivalent)

13.1 Is the Initial Calibration Form (Form VI/ Equivalent) present and complete for the semivolatile fraction? [ ] ___ ___

ACTION: If any calibration forms or standard row data are missing, take action specified in 3.2 above.

13.2 Are all base neutral or acid RRFs > 0.050? [ ] ___ ___

YES NO N/A

Check the **average RRFs** of the four System Performance Check Compounds (SPCCs): N-nitroso-di-n-propylamine, hexachlorocyclopentadiene, 2,4-dinitrophenol, and 4-nitrophenol. These compounds must have **average RRFs** greater than or equal to 0.05 before running samples and should not show any peak tailing.

ACTION: Circle all outliers in red.

ACTION: For any target analyte with **average RRF <0.05**

1. "R" all non-detects;

2. "J" all positive results.

13.3 Are response factors for base neutral or acid target analytes stable over the concentration range of the calibration (% Relative standard deviation [%RSD] < 20.0%)? [ ] ___ ___

NOTE: The % RSD for each individual Calibration Check Compound (CCC, Method 8270D-40 see Table 4) must be less than 30% before analysis can begin. If grater 30%, the lab must clean and recalibrate the instrument.

CALIBRATION CHECK COMPOUNDS

Base/Neutral Fraction	Acid Fraction
Acenaphthene	4-Chloro-3-methylphenol
1,4-Dichlorobenzene	2,4-Dichlorophenol
Hexachlorobutadiene	2-Nitrophenol
Diphenylamine	Phenol
Di-n-octyl phthalate	Pentachlorophenol
Fluoranthene	2,4,6-Trichlorophenol

YES NO N/A

Benzo(a)pyrene

ACTION: If the %RSD for any CCC >30% and no corrective action taken, then "J" qualify all positive hits and "UJ" qualify all non-detects.

ACTION: Circle all outliers in red.

ACTION: If the % RSD is ≥ 20.0%, qualify positive results for that analyte "J" and non-detects using professional judgement. When RSD > 90%, flag all non- detect results for that analyte "R," unusable. Alternatively, the lab should calculate first or second order regression fit of the calibration curve and select the fit which introduces the least amount of error.

NOTE: Analytes previously qualified "U" due to blank contamination are still considered as "hits" when qualifying for calibration criteria.

13.4 Did the laboratory calculate the calibration curve by the least squares regression fit? ___ [ ] ___

13.5 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or % RSD? (Check at least two values but if errors are found, check more.) ___ [ ] ___

ACTION: Circle Errors in red.

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and note errors in data assessments.

13.5 Do the target compounds for this SDG include Pesticides? [ ] ___ ___

	YES	NO	N/A
13.6 If the pesticide compounds include DDT, was the percent breakdown of DDT to DDD and DDE greater than 20%?	___	[ ]	___

ACTION: If DDT percent breakdown exceeds 20%:

i. Qualify all positive results for DDT with "J". If DDT was not detected, but DDD and DDE results are positive, qualify the quantitation limit for DDT as unusable, "R".

ii. Qualify all positive results for DDD and DDE as presumptively present at an approximate concentration "JN".

14.0 GC/MS Calibration Verification (Form VII/Equivalent)

	YES	NO	N/A
14.1 Are the Calibration Verification Forms (Form VII) present and complete for all compounds of interest?	[ ]	___	___
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample analysis per instrument?	[ ]	___	___

ACTION: List below all sample analyses that were not within twelve hours of a calibration verification analysis for each instrument used.

_____

_____

_____

ACTION: If any forms are missing or no calibration verification standard has been analyzed within twelve hours of every sample analysis,

	YES	NO	N/A
call lab for explanation/resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").			
14.3 Do any of the SPCCs have an RRF <0.05?	___	[ ]	___
If YES, make a note in data assessment if the lab did not take corrective action specified in section 7.4.4, page 8270D-18.	[ ]	___	___
14.4 Do any of the CCCs have a %D between the initial and continuing RRF which exceeds 20.0%?			
ACTION: If yes, make a note in data assessment.			
14.5 Do any semivolatile compounds have a % Difference (% D) between the initial and continuing RRF which exceeds 20.0%?	___	[ ]	___
ACTION: Circle all outliers in red.			
ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated (J). When %D is above 90%, qualify all non-detects for that analyte as "R", unusable.			
14.6 Do any semivolatile compounds have a RRF < 0.05?	___	[ ]	___
ACTION: Circle all outliers in red.			
ACTION: If RRF < 0.05, qualify as unusable ("R") associated non-detects and "J" associated positive values.			
14.7 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or percent difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more).	___	[ ]	___

YES NO N/A

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

YES NO N/A

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect(s) in the data assessments.

15.0 Internal Standards (Form VIII)

15.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to + 100%) for each continuing calibration? [ ] ___ ___

ACTION: List each outlying internal standard below.

Sample ID	IS #	Area	LowerLimit	Upper Limit

(Attach additional sheets if necessary.)

Note: Check Table 5, 8270D-41 for associated analytes.

ACTION: i. If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard.

ii. Non-detects associated with IS > 100% should not be qualified.

YES NO N/A

iii. If the IS area is below the lower limit (<50%), qualify all associated non-detects (U-values) "J". If extremely low area counts are reported (<25%) or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable (R).

15.2 Are the retention times of all internal standards within 30 seconds of the associated calibration standard? [ ] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

16.0 Laboratory Control Samples (LCS)

16.1 Were any LCS samples run in order to verify analytes which failed criteria for spike recovery? [ ] ___ ___

16.2 Did the lab spike LCS sample spiked with the same analytes and the same concentrations as the matrix spike? [ ] ___ ___

16.3 Were the mean and standard deviation of all analytes within the QC acceptance ranges as shown in Table 6, 8270D-43? [ ] ___ ___

ACTION: If the recovery of any analyte falls out of the designated range, the analytical results for that compound is suspect and should be qualified "J" in the unspiked samples.

17.0 Field Duplicates

17.1 Were any field duplicates submitted for semivolatile analysis? [ ] ___ ___

Data Review and Validation for: Metals - Total and Dissovled Lead only

Project Name & Task:	Navy Clean 1000	CTO-JM05 NAPR SWMU 75	
Project # & Case/SDG:		SF5750	
Methods:	☐ ILM04.0 ☑ SW-846 (6010B,7000 Series) ☐ Hg 7470A/71A ☐ 200 series ☐ 300 series ☐ 1600 series		
Program:	☐ AFCEE ☐ NFESC ☐ Other:	**Number of Samples:**	14
Field QC Samples:	3/5, 4/6 - NAT/FD, 9/10 and 13/14 Tot/Dissolved Ebs, #11,12 and 14 native for MS/SD		
Reviewed by & Date:	H. Kelly	11/30/2012	
Matrix:	☑ Water ☐ Soil ☐ Other		

Quality Control	Form #	Requirements	Check (If No* checked, see comments)	Flags Applied (see comments)
Data Pkg Complete (DP)	Pkg	All required deliverables in pkg.	☑ OK ☐ No* ☐ Not provided	☐ Flags Applied
	COC	All samples on COC reported	☑ OK ☐ No*	☐ Flags Applied
Holding Times (HT)	1, 13, 14, COC	Cyanide 14 day HT met	☐ OK ☐ No* ☑ N/A	☐ Flags Applied
		Mercury 28 day HT met	☐ OK ☐ No* ☑ N/A	☐ Flags Applied
		Other metals 180 day HT met	☑ OK ☐ No* ☐ N/A	☐ Flags Applied
Initial Calibration (IC)	14	Min. initial # of levels per method	☑ OK ☐ No* ☐ Not provided	☐ Flags Applied
	raw	Linearity method criteria	☑ OK ☐ No* ☐ Not provided	
	2	ICV criteria	☑ OK ☐ No*	
Continuing Calibration (CC)	14	CCV frequency	☑ OK ☐ No*	☐ Flags Applied
	2	CCV critieria	☑ OK ☐ No*	
Blanks (PB,EB,FB/AB)	3	Detects (>RL/CRDL)	☑ OK ☐ No* ☐ see blnk wksht	☐ Flags Applied
ICB and CCB	3	ICB, CCB	☑ OK ☐ No* ☐ see blnk wksht	
Prep Blank Frequency (PB)	3	1 PB per batch	☑ OK ☐ No*	
ICP Interference Check (ICS)	4	Method criteria met	☑ OK ☐ No*	☐ Flags Applied
MS/MSD or MS/LD	5	☑ MS/MSD ☐ MS/LD ☐ None*	☑ OK ☐ No*	☐ Flags Applied
	5	Recovery Limits: ☐ Lab ☑ Meth	☑ OK ☐ No*	
	6	Precision criteria	☑ OK ☐ No*	
Post Spike Samp. Recov.	5	Criteria met	☑ OK ☐ No* ☐ N/A	☐ Flags Applied
Duplicate Samples (LD)	6	Criteria met	☐ OK ☐ No* ☑ N/A	☐ Flags Applied
LCS (BS) ☑ LCS only ☐ LCS/LCSD	7	Frequency	☑ OK ☐ No* ☐ N/A	☐ Flags Applied
		Acceptance criteria met	☑ OK ☐ No*	
Standard Addition	8	Criteria met	☐ OK ☐ No* ☑ N/A	☐ Flags Applied
ICP Serial Dilution (SD)	9	Criteria met	☑ OK ☐ No* ☐ N/A	☐ Flags Applied
Internal Standard (IS)		Internal Standards used	☐ OK ☐ No* ☑ N/A	
Sample Evaluations (SAM)	1	All hits within cal. Range	☑ OK ☐ No* ☐ All ND	☐ Flags Applied
	1	Total > Dissolved	☑ OK ☐ No* ☐ N/A	☐ Flags Applied
Field Duplicates (FD)	1	Precision of native vs Field Dup	☑ OK ☐ No* ☐ N/A	☐ Flags Applied

This sheet is applicable to multiple methods. All requirement items may not apply to every analytical method.

Case Narrative Comments:

No exceptions noted

Data Review and Validation for: Metals - Total and Dissovled Lead only

Project Name & Task:	Navy Clean 1000	CTO-JM05 NAPR SWMU 75	
Project # & Case/SDG:		SF5750	
Methods:	☐ ILM04.0 ☑ SW-846 (6010B,7000 Series) ☐ Hg 7470A/71A ☐ 200 series ☐ 300 series ☐ 1600 series		
Program:	☐ AFCEE ☐ NFESC ☐ Other:	**Number of Samples:**	14
Field QC Samples:	3/5, 4/6 - NAT/FD, 9/10 and 13/14 Tot/Dissolved Ebs, #11,12 and 14 native for MS/SD		
Reviewed by & Date:	H. Kelly	11/30/2012	
Matrix:	☑ Water ☐ Soil ☐ Other		

QC Item	Comments
	No qualifiers applied.

Data Validation Summary CompuChem SDG 1003251

DataQual

Environmental Services, LLC

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

June 24, 2010
SDG# 1003251, CompuChem
NAPR SWMU 75, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003251. 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, and 6020B, 6010B and 7470A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
75FB01	1003251-01	water	X	X	X	X	X	X
75ER01	1003251-02	water	X	X	X	X	X	X
75TB01	1003251-03	water	X		X			

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP 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 calibration exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected for these compounds.

SVOA

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

Due to recoveries below 10% for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds.

GRO

No qualifications to the data were required.

DRO

No qualifications to the data were required.

App IX Metals by 6020/7470A

No qualifications to the data were required.

Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The data package was received complete and intact. Resubmissions were required. The metals results were initially reported as non-detect at the MDL but the project required the reporting of non-detect results to the RL. All metals forms were resubmitted.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/29/10 and samples were received at the laboratory 3/30/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited 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 4/06/10	acetone acrylonitrile 2-butanone isobutyl alcohol 1,4-dioxane	0.029 0.036 0.045 0.003 0.0006	all samples	J/R

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 3/17/10	2-picoline	22.651	all samples	J/UJ
	n-nitrosodiethylamine	21.768		
	n-nitrosopyrrolidine	24.941		
	n-nitrosomorpholine	22.939		
	o-toluidine	22.524		
	n-nitrosopiperidine	24.199		
	p-phenylenediamine	28.824		
	1-naphthylamine	27.268		
	2-naphthylamine	30.303		
	5-nitro-o-toluidine	27.604		
	n-nitrosodiphenylamine	16.397		
	diallate (trans isomer)	23.234		
	4-aminobiphenyl	24.870		
	4-nitroquinoline-1-oxide	19.692		
	methapyrilene	29.063		
	p-dimethylaminoazobenzene	25.398		
	3,3'-dimethylbenzidine	29.792		
	2-acetylaminofluorene	24.074		
	indeno(1,2,3-cd)pyrene	19.789		
	diallate (total)	19.303		
CC-full scan 4/20610	n-nitroso-di-n-butylamine	-39.22	all samples	J/UJ
	2-chloronaphthalene	-37.60		
	dibenzo(a,h)anthracene	24.08		
	benzo(g,h,i)perylene	28.35		

Laboratory Control Sample

SVOA

The submitted LCS exhibited non-compliant recoveries requiring qualification or rejection in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

LCS	Sample IDs	Compounds	%Recovery	QC Limit	Q Flag
SRLLCS	all samples	p-phenylenediamine	0	20-150	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,

Jacqueline Cleveland

Jacqueline Cleveland
Vice- President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acetone acrylonitrile 2-butanone isobutyl alcohol 1,4-dioxane	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	2-picoline n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	+/-	J/UJ
all samples	n-nitroso-di-n-butylamine 2-chloronaphthalene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
all samples	p-phenylenediamine	+/-	J/R

GRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

Summary of Data Qualifications

DRO

Sample ID	Compound	Results	Q flag
No qualifications required.			

App IX Metals

Sample ID	Analyte	Results	Q flag
No qualifications required.			

Tin

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

COMPUCHEM SDG 1003252

DataQual

Environmental Services, LLC

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

June 24, 2010
SDG# 1003252, CompuChem
NAPR SWMU 75, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003252. 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, 6010B, 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 qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
75SB01-00	1003252-01	soil	X	X	X	X	X	X
75SB01-01	1003252-02	soil	X	X	X	X	X	X
75SB01-01D	1003252-03	soil	X	X	X	X	X	X
75SB01-04	1003252-04	soil	X	X	X	X	X	X
75SB02-00	1003252-05	soil	X	X	X	X	X	X
75SB02-01	1003252-06	soil	X	X	X	X	X	X
75SB02-04	1003252-07	soil	X	X	X	X	X	X
75SB03-00	1003252-08	soil	X	X	X	X	X	X
75SB03-01	1003252-09	soil	X	X	X	X	X	X
75SB03-04	1003252-10	soil	X	X	X	X	X	X
75SB04-00	1003252-11	soil	X	X	X	X	X	X
75SB04-00D	1003252-12	soil	X	X	X	X	X	X
75SB04-01	1003252-13	soil	X	X	X	X	X	X
75SB04-04	1003252-14	soil	X	X	X	X	X	X
75SB05-00	1003252-15	soil	X	X	X	X	X	X
75SB05-01	1003252-16	soil	X	X	X	X	X	X
75SB04-01 MS	1003252-13MS	soil	X	X	X	X	X	X
75SB04-01 MSD	1003252-13MSD	soil	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample 75SB01-01D-field duplicate of sample 75SB01-01; and sample 75SB04-00D -field duplicate of sample 75SB04-00.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition
- Technical Holding Times *
- GC/MS Tuning *
- ICP Tuning *
- GC Performance *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples
- Matrix Spike Recoveries
- Matrix Duplicate RPDs
- Serial Dilutions
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

* - indicates that qualifications were not required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

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

Due to high %RSDs and %D values, in the initial and continuing calibrations, some compounds were qualified as estimated. The continuing calibrations exhibited some compounds with low RRF values, which resulted in qualifying non-detected values as rejected 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.

Due to below 10% recoveries for LCS samples, the associated sample non-detect results were qualified as rejected for one or more compounds. Non-compliant recoveries were also exhibited that required some compound results to be qualified as estimated.

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying two compound results as rejected in the associated sample.

The two field duplicate pairs did not exhibit comparable results; therefore several results were qualified as estimated.

Dilutions were required for two samples to obtain results within the calibration range.

Two compound results, for one sample, were qualified as tentatively identified with approximate concentration as the laboratory could not resolve the compounds chromatographically.

GRO

Soil samples were collected in unpreserved 4-oz jars and analyzed on days 10 and 11; therefore results were qualified as estimated and considered biased low.

Qualifications were added to the data due to method blank contamination.

DRO

Qualifications were added to the data due to method blank contamination.

App IX Metals by 6020/7471A

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

The matrix spikes pair submitted in this SDG exhibited non-compliant recoveries in both the MS and the MSD for one analyte for which qualifications were required.

The matrix duplicate submitted in this SDG exhibited non-compliant %RPDs >35% for arsenic and vanadium. All results for these analytes were qualified as estimated J/UJ in the metals samples.

The serial dilution submitted in this SDG exhibited a non-compliant %D for the analyte vanadium. All results for vanadium in the metals samples were qualified as estimated J/UJ.

The field duplicate pair of sample 75SB01-01/75SB01-01D exhibited one analyte with a non-compliant absolute difference results. This analyte was flagged based on Region II guidance in the field duplicate pair only.

All results reported at concentrations between the method detection limit and the reporting limits (B flagged by the laboratory) were qualified as estimated J.

Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The data package was received complete and intact. Resubmissions were required. The metals results were initially reported as non-detect at the MDL but the project required the reporting of non-detect results to the RL. All metals forms were resubmitted.

Sample Condition

GRO

Soil samples were collected in unpreserved 4-oz jars and were analyzed on days 10 and 11; therefore results were qualified as estimated (J/UJ). Sample analysis exceeded the 7-day holding time requirement per method and SW 846 Chapter Four section 4.1; however analysis was within 14 days and therefore results were qualified as estimated and should be considered biased low.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/29/10 and samples were received at the laboratory 3/31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

Calibration standards exhibited %Ds and RRF values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	0.028 0.046 0.018 0.006 0.002 0.049	all samples	J/R
	1,2-dichloropropane	16.913		J/UJ
CC 4/1/10	acetone	0.048	all samples	J/R
	chloromethane	24.14		J/UJ

SVOA

Calibration standards exhibited %RSDs and %D values that were non-compliant. A summary of these non-compliances and affected samples are noted in the following table. Sample results are qualified as indicated.

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 4/16/10	benzyl alcohol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	15.016 21.849 20.128 19.278 23.521 16.318 29.966	all samples	J/UJ
CC-full scan 4/25/10	2,6-dichlorophenol p-phenylenediamine	20.12 38.30	75SB04-01, 75SB01-00, 75SB01-01, 75SB01-04	J/UJ
CC-full scan 4/26/10	pyridine aniline p-phenylenediamine 2-acetylaminofluorene aramite	22.35 24.62 -32.35 22.03 21.63	75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB03-01, 75SB03-04, 75SB01-01D, 75SB04-04, 75SB05-00, 75SB05-01	J/UJ
CC-full scan 4/26/10	p-phenylenediamine 1-naphthylamine methapyrilene	-42.07 -20.11 -29.90	75SB04-00	J/UJ
CC-full scan 5/03/10	aniline 4-chloroaniline p-phenylenediamine dinoseb	20.39 -23.66 -48.20 25.90	75SB04-00DRE	J/UJ
IC-SIM 4/26/10/10	indeno(1,2,3-cd)pyrene	15.549	all samples	J/UJ

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC-SIM 4/29/10	benzo(a)anthracene benzo(b)fluoranthene benzo(k)fluoranthene	21.29 -21.29 -43.04	75SB04-01, 75SB01-01, 75SB01-04, 75SB02-00, 75SB02-01, 75SB03-01, 75SB03-04, 75SB04-00, 75SB04-04, 75SB05-00, 75SB05-01	J/UJ
CC-SIM 4/30/10	benzo(a)anthracene dibenz(a,h)anthracene	23.88 24.83	75SB02-04, 75SB01-00, 75SB03-00	J/UJ
CC-SIM 5/01/10	2-methylnaphthalene chrysene	-24.00 -22.24	75SB04-00DRE	J/UJ

Blanks

VOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit	Action Level
VBLKSI	acetone	6.6J ug/Kg	13 ug/Kg	2X RL

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

Sample ID	Compound	Q Flag
75SB01-01, 75SB01-01D, 75SB04-00, 75SB04-00D, 75SB04-01	acetone	U

SVOA

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Reporting Limit
SBLKRU	di-n-butylphthalate	26J ug/Kg	170 ug/Kg
SBLKRU-SIM	naphthalene	1.7J	8.3
	2-methylnaphthalene	1.2J	8.3
	acenaphthene	0.66J	8.3
	fluorene	0.74J	8.3
	phenanthrene	1.5J	8.3
	anthracene	0.58J	8.3
	pyrene	0.57J	8.3
	benzo(a)anthracene	0.68J	8.3
75ER01-SIM	naphthalene	0.084J ug/L	0.20 ug/L
75FB01	naphthalene	0.085J ug/L	0.20 ug/L

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

Sample ID	Compound	Q Flag
75SB01-00, 7SSB01-01	di-n-butylphthalate	U at RL
PAH SIM: 75SB01-00, 75SB01-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB04-01, 75SB04-04, 75SB05-00, 75SB05-01	naphthalene	U at RL
PAH SIM: 75SB01-00, 75SB01-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB05-00	2-methylnaphthalene	U at RL
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB05-00, 75SB05-01	acenaphthene	U at RL

Sample ID	Compound	Q Flag
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB04-04, 75SB05-00, 75SB05-01	fluorene	U at RL
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-04, 75SB04-00, 75SB04-01, 75SB04-04, 75SB05-01	phenanthrene	U at RL
PAH SIM: 75SB01-04, 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-00, 75SB04-01	anthracene	U at RL
PAH SIM: 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-01, 75SB04-04	pyrene	U at RL
PAH SIM: 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-00, 75SB04-01	benzo(a)anthracene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	RL	Action Level
VBLKDI	GRO	0.044J mg/Kg	0.5 mg/Kg	RL
VBLKDK	GRO	0.04J	0.5	RL

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

Sample ID	Compound	Q Flag
all samples	GRO	U at RL

DRO

The associated instrument blanks exhibited contamination as noted in the following table. Compounds for which there was no action required, are not included in the following table, see worksheets for full list of compounds.

Blank ID	Compound	Concentration	Action Level	Q Flag
PIBLKXR	DRO	0.30J mg/L	RL	U at RL
PIBLKXS	DRO	0.027J mg/L	RL	U at RL
PIBLKXT	DRO	0.068J mg/L	RL	U at RL
PIBLKXU	DRO	0.13J mg/L	RL	U at RL
PIBLKXV	DRO	0.45J mg/L	RL	U at RL

Appendix IX Metals by 6020/7471B

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
ICB Run #2	antimony	0.250J ug/L	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL ≤ RL except 75-SB04-01	antimony	U at RL

Tin by 6010B

Associated blanks exhibited contamination as noted in the following table. Please see the Glossary of Qualification Flags and Abbreviations for details.

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	1.667B mg/Kg	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL ≤ RL	tin	U at RL

Laboratory Control Sample

SVOA

The submitted LCS exhibited non-compliant recoveries requiring qualification or rejection in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

LCS	Sample IDs	Compounds	%Recovery	QC Limit	Q Flag
SRULCS full scan	all samples (initial analysis)	2,4-dichlorophenol	38	42-119	J/UJ
		p-phenylenediamine	0	20-150	J/R
		methapyrilene	6	20-150	
SRVLCS SIM	all samples (initial analysis)	benzo(b)fluoranthene	117	45-115	J
		benzo(k)fluoranthene	150	45-125	
		indeno(1,2,3-cd)pyrene	170	40-125	
		dibenzo(a,h)anthracene	159	40-125	
		benzo(g,h,i)perylene	133	40-125	
SXVLCS	75SB04-00DRE	p-phenylenediamine	0	20-150	J/R
SXWLCS SIM	75SB04-00DRE	indeno(1,2,3)pyrene	127	40-125	J

Matrix Spike

SVOA

The matrix spike and matrix spike duplicate associated with sample 75SB04-01 exhibited zero or below 10% recoveries for p-phenylenediamine and hexachlorocyclopentadiene; therefore the non-detect result for these compounds were qualified as rejected (R).

Appendix IX Metals by 6020/7471B

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for three analytes, requiring qualification or rejection in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
75SB04-01	antimony	all samples	61/65	J/UJ

Matrix Duplicates

Appendix IX Metals by 6020/7471B

The matrix duplicate analysis submitted in this SDG exhibited a non-compliant RPDs >35% for two analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MD	Analytes	Samples	RPD	Q Flag
75-SB04-01	arsenic	all samples	45	J/UJ
	vanadium		38	

Serial Dilutions

Appendix IX Metals by 6020/7471B

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

SD	Analytes	Samples	%D	Q Flag
75SB04-01	vanadium	all samples	14	J/UJ

Field Duplicates

SVOA

The field duplicate pairs listed in the table below exhibited non-comparable results and were qualified as stated.

Duplicate pair	Compound	% RPD	Q flag
75SB04-00 and 75SB04-00DRE	fluoranthene	112	J
	pyrene	123	
	chrysene	125	
	benzo(b)fluoranthene	105	
	benzo(k)fluoranthene	124	
	benzo(a)pyrene	117	
	indeno(1,2,3-cd)pyrene	200	
75SB01-01 and 75SB01D-01	benzo(b)fluoranthene	99	J
	benzo(k)fluoranthene	94	
	benzo(a)pyrene	102	

Appendix IX Metals by 6020/7471B

One of the field duplicate pairs exhibited non-compliant field duplicate reproducibility for one analyte. The field duplicate pair and analyte were flagged as noted in the table below based on Region II guidelines.

Sample ID	Analyte	RPD or Absolute Difference	Q Flag
57SB07-00/57SB07-00D	antimony	4.7	R

Identification/Quantitation

SVOA

Sample 75SB04-00D was not used in favor of the re-analysis, due to non-compliant surrogate recoveries.

Sample 75SB04-00RE was not used, in favor of the initial analysis, due to surrogate recoveries.

Sample 75SB01-00 (SIM) and 75SB03-00 (SIM) required a dilution to obtain results within the calibration. For these samples, the E-flagged results in the initial analyses were rejected in favor of the corresponding D-flagged results in the diluted analyses. The dilution of sample 75SB01-00 (SIM) exhibited results above the calibration range; therefore these results were qualified as estimated (J).

According to the case narrative, and raw data, benzo(b)fluoranthene and benzo(k)fluoranthene could not be chromatographically resolved for sample 75SB04-00. Therefore results for these compounds were flagged JN, indicating the presence of the compounds was tentatively identified and the associated numerical value represents its approximate concentration. This issue also occurred in the initial analysis of sample 75SB03-00; however in the diluted analysis, which is the run in which the results for these two compounds was used, these compounds were resolved. Therefore no qualifications were required for sample 75SB03-00.

Appendix IX Metals by 6020/7471B

All results reported at concentrations between the method detection limit and the reporting limit (B flagged by the laboratory) were qualified as estimated J.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
all samples	acetone	+/-	J/R
all samples	chloromethane	+/-	J/UJ
75SB01-01, 75SB01-01D, 75SB04-00, 75SB04-00D, 75SB04-01	acetone	+	U

SVOA

Sample ID	Compound	Results	Q flag
all samples	benzyl alcohol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-	J/UJ
75SB04-01, 75SB01-00, 75SB01-01, 75SB01-04	2,6-dichlorophenol p-phenylenediamine	+/-	J/UJ
75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB03-01, 75SB03-04, 75SB01-01D, 75SB04-04, 75SB05-00, 75SB05-01	pyridine aniline p-phenylenediamine 2-aceylaminofluorene aramite	+/-	J/UJ
75SB04-00	p-phenylenediamine 1-naphthylamine methapyrilene	+/-	J/UJ
75SB04-00DRE	aniline 4-chloroaniline p-phenylenediamine dinoseb	+/-	J/UJ
PAH SIM: all samples	indeno(1,2,3-cd)pyrene	+/-	J/UJ
PAH SIM: 75SB04-01, 75SB01-01, 75SB01-04, 75SB02-00, 75SB02-01, 75SB03-01, 75SB03-04, 75SB04-00, 75SB04-04, 75SB05-00, 75SB05-01	benzo(a)anthracene benzo(b)fluoranthene benzo(k)fluoranthene	+/-	J/UJ
PAH SIM: 75SB02-04, 75SB01-00, 75SB03-00	benzo(a)anthracene dibenz(a,h)anthracene	+/-	J/UJ
PAH SIM: 75SB04-00DRE	2-methylnaphthalene chrysene	+/-	J/UJ
75SB01-00, 7SSB01-01	di-n-butylphthalate	+	U at RL
PAH SIM: 75SB01-00, 75SB01-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB04-01, 75SB04-04, 75SB05-00, 75SB05-01	naphthalene	+	U at RL

Summary of Data Qualifications

SVOA, continued

Sample ID	Compound	Results	Q flag
PAH SIM: 75SB01-00, 75SB01-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB05-00	2-methylnaphthalene	+	U at RL
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB05-00, 75SB05-01	acenaphthene	+	U at RL
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-01, 75SB02-04, 75SB03-00, 75SB04-00, 75SB04-04, 75SB05-00, 75SB05-01	fluorene	+	U at RL
PAH SIM: 75SB01-01, 75SB02-00, 75SB02-04, 75SB04-00, 75SB04-01, 75SB04-04, 75SB05-01	phenanthrene	+	U at RL
PAH SIM: 75SB01-04, 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-00, 75SB04-01	anthracene	+	U at RL
PAH SIM: 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-01, 75SB04-04	pyrene	+	U at RL
PAH SIM: 75SB02-00, 75SB02-04, 75SB03-04, 75SB04-00, 75SB04-01	benzo(a)anthracene	+	U at RL
all samples (initial analysis)	2,4-dichlorophenol	+/-	J/UJ
all samples (initial analysis)	p-phenylenediamine methapyrilene	+/-	J/R
all samples (initial analysis) -SIM	benzo(b)fluoranthene benzo(k)fluoranthene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+	J
75SB04-00DRE	p-phenylenediamine	+/-	J/R
75SB04-00DRE -SIM	indeno(1,2,3)pyrene	+	J
75SB04-01	p-phenylenediamine hexachlorocyclopentadiene	-	R
75SB04-00 (SIM) and 75SB04-00DRE (SIM)	fluoranthene pyrene chrysene benzo(b)fluoranthene benzo(k)fluoranthene benzo(a)pyrene indeno(1,2,3-cd)pyrene	+	J
75SB01-01 and 75SB01D-01	benzo(b)fluoranthene benzo(k)fluoranthene benzo(a)pyrene	+	J
75SB04-00D, 75SB04-00RE	all results	+/-	R
75SB01-00 (SIM), 75SB03-00 (SIM)	all E-flagged compounds	+	R
75SB01-00DL (SIM), 75SB03-00DL (SIM)	all results except D-flagged compounds	+/-	R
75SB01-00DL (SIM)	all E-flagged results	+	J
75SB04-00	benzo(b)fluoranthene benzo(k)fluoranthene	+/-	JN

Summary of Data Qualifications

GRO

Sample ID	Compound	Results	Q flag
all soil samples	GRO	+/-	J/UJ
all samples	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
all samples	DRO	+J	U at RL

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL ≤ RL except 75-SB04-01	antimony	+B	U at RL
all samples	antimony	+/-	J/UJ
all samples	arsenic vanadium	+/-	J/UJ
all samples	vanadium	+/-	J/UJ
75SB04-00, 74SB04-00D	lead	+	R
all samples	all analytes	+B	J

Tin by 6010B

Sample ID	Analyte	Results	Q flag
all samples >MDL ≤ RL	tin	+B	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

NA -	The sample result is greater than the RL and greater than ten times (10X) the blank value. 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 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.

Glossary of Qualification Flags and Abbreviations, continued

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.

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 for the blank contaminant is less than the RL 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.

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.

Glossary of Qualification Flags and Abbreviations, continued

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

PUERTO RICAN CHEMIST CERTIFICATION

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel Range organics fraction following Method 8015C, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02
1003251-03

Lcda. Daliz M. Estades Santaliz

PO Box 727
Dorado, PR 00646-0727

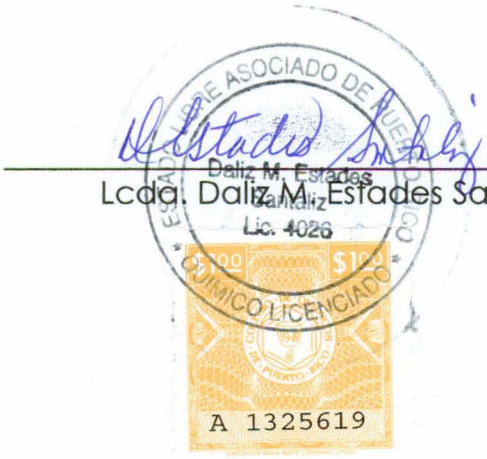
Ðaliz Ëstades Ṡantalíz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Gasoline Range Organics (GRO) following Method 8015B, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02
1003251-03



Lcda. Daliz M. Estades Santaliz

PO Box 727
Dorado, PR 00646-0727

Ðaliz Ëstades Ŝantalíz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Volatile Fraction following Method 8260B, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02
1003251-03

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PO Box 727
Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Metal Tin following Method SW 846, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02

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Lic. 4025

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Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Semivolatile and semivolatile selected Ion Monitoring (SIM) fractions following Method 8270C, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02

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Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003251-01
1003251-02

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Ðaliz Ëstades Santalíz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Semivolatile and semivolatile selected Ion Monitoring (SIM) fractions following Method 8270C, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

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Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

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Dorado, PR 00646-0727

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Metal Tin following Method SW 846, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

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Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Gasoline Range Organics (GRO) following Method 8015B, from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers:

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

Lcda. Daliz M. Estades Santaliz

COLEGIO DE QUÍMICOS DE PUERTO RICO
Daliz M. Estades Santaliz
Lic. 4026
QUÍMICO LICENCIADO
A 1325627

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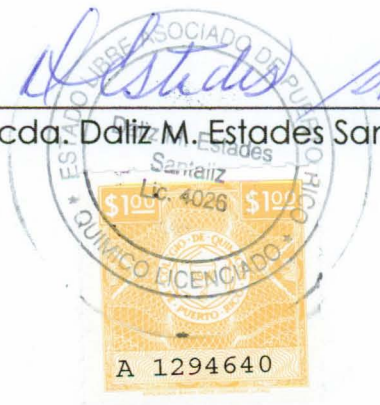
To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for volatile fraction, following Method 8260B from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers.

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

Lcda. Daliz M. Estades Santaliz



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To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Diesel and Oil range organics fraction, following Method 8015C from Project Name NAPR SWMU75/DO, and Laboratory ID Numbers.

1003252-01	1003252-09
1003252-02	1003252-10
1003252-03	1003252-11
1003252-04	1003252-12
1003252-05	1003252-13
1003252-06	1003252-14
1003252-07	1003252-15
1003252-08	1003252-16

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