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FINAL REVISED PHASE I RCRA FACILITY INVESTIGATION REPORT FOR SOLID WASTE MANAGEMENT UNIT (SWMU) 67 NAVAL ACTIVITY PUERTO RICO

7/1/2016

CH2M

Final

Revised Phase I RCRA Facility Investigation Report for Solid Waste Management Unit 67 – Former Gas Station

Naval Activity Puerto Rico
Ceiba, Puerto Rico

Contract Task Order JM05

July 2016

Prepared for

Department of the Navy
Naval Facilities Engineering Command

Under the

CLEAN 1000 Program
Contract N62470-06-D-1000

Prepared by

ch2m

Contents

Acronyms and Abbreviations ..... **v**

1 Introduction **1-1**
1.1 Objectives and Approach 1-1
1.2 Report Organization 1-1

2 Background and Description **2-1**
2.1 NAPR Background 2-1
2.2 SWMU 67 Description and Previous Investigations 2-1
2.2.1 Site Description 2-1
2.2.2 Previous Investigations 2-2

3 Phase I RFI Activities **3-1**
3.1 2010 Phase I RFI Field Activities 3-1
3.1.1 Mobilization 3-1
3.1.2 Wetland Delineation 3-1
3.1.3 Field Sample Collection 3-2
3.1.4 Surveying 3-5
3.1.5 Investigation-Derived Waste Management 3-6
3.2 2014 Phase I RFI Field Activities 3-6
3.2.1 Geophysical Survey 3-6
3.2.2 Subsurface Soil Sampling 3-6

4 Physical Characteristics **4-1**
4.1 Regional Characteristics 4-1
4.1.1 Climate, Topography, and Hydrology 4-1
4.1.2 Geology and Hydrogeology 4-1
4.2 SWMU 67 Characteristics 4-2
4.2.1 Topography and Hydrology 4-2
4.2.2 Geology and Hydrogeology 4-2
4.2.3 Land Uses and Resources 4-2

5 Analytical Results and Data Evaluation **5-1**
5.1 SWMU 67 Data Evaluation Results 5-5

6 Conclusions and Recommendations **6-1**
6.1 Conclusions 6-1
6.2 Recommendation 6-1

7 References **7-1**

Appendixes

A Field Investigation Information
B Wetland Delineation Report
C Chromium Memorandum
D Analytical Laboratory Results
E Data Validation Summary Reports
F Data Quality Evalution

Tables (located at the end of each section)

3-1 Summary of Sampling and Analytical Program
3-2 Summary of Soil Borings, Monitoring Well Specifications, and Water Level Elevations

5-1 Surface Soil Detections and Exceedances of Screening Criteria
5-2 Subsurface Soil Detections and Exceedances of Screening Criteria
5-3 Groundwater Detections and Exceedances of Screening Criteria
5-4 HHRA COPC Summary Table – Residential Land Use
5-5 HHRA COPC Summary Table – Industrial Land Use
5-6 Ecological Screening Statistics – SWMU 67 Surface Soil – Plants and Soil Invertebrates
5-7 Screening Statistics – SWMU 67 Surface Soil – Mammal/Bird Eco-SSLs
5-8 Summary of Norway Rat Exposure Doses – 95% UCL
5-9 Summary of Indian Mongoose Exposure Doses – 95% UCL
5-10 Summary of Pearly-eyed Thrasher Exposure Doses – 95% UCL
5-11 Summary of Common Ground Dove Exposure Doses – 95% UCL
5-12 Summary of Red-tailed Hawk Exposure Doses – 95% UCL
5-13 Summary of Norway Rat Exposure Doses – Arithmetic Mean
5-14 Summary of Indian Mongoose Exposure Doses – Arithmetic Mean
5-15 Summary of Pearly-eyed Thrasher Exposure Doses – Arithmetic Mean
5-16 Summary of Common Ground Dove Exposure Doses – Arithmetic Mean
5-17 Summary of Red-tailed Hawk Exposure Doses – Arithmetic Mean

Figures (located at the end of each section)

2-1 Site Location Map and Historical Site Layout
2-2 Site Features
2-3 ECP Sample Locations

3-1 ECP and RFI Sample Locations
3-2 Suface Soil Sample Locations
3-3 Subsurface Soil Sample Locations
3-4 Groundwater Sample Locations
3-5 Surface Water Sample Location
3-6 Geophysical Survey Investigation Area

4-1 Geologic Cross Section A-A’
4-2 Geologic Cross Section B-B’
4-3 Groundwater Potentiometric Surface

5-1 Data Evaluation 6 Step Decision Process
5-2 Surface Soil Exceedances of Screening Criteria – Organic Compounds
5-3 Surface Soil Exceedances of Screening Criteria – Inorganic Compounds
5-4 Subsurface Soil Exceedances of Screening Criteria – Organic Compounds
5-5 Subsurface Soil Exceedances of Screening Criteria – Inorganic Compounds
5-6 Groundwater Exceeances of Screening Criteria – Organic Compounds
5-7 Groundwater Exceedances of Screening Criteria – Inorganic Compounds

Acronyms and Abbreviations

°F	degree Fahrenheit
µg/kg	microgram per kilogram
µg/L	microgram per liter
AOC	Area of Concern
ATSDR	Agency for Toxic Substances and Disease Registry
Baker	Michael Baker Jr., Inc.
bgs	below ground surface
CH2M HILL	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
COPC	constituent of potential concern
DAF	dilution attenuation factor
DGPS	Differential Global Positioning System
DPT	direct push technology
DRO	diesel range organics
Eco-SSL	ecological soil screening level
ECP	Environmental Condition of Property
ELCR	excess lifetime cancer risk
EPC	exposure point concentration
ERA	Ecological Risk Assessment
eV	electron volt
ft	feet/foot
GPS	Global Positioning System
GRO	gasoline range organics
HHRA	Human Health Risk Assessment
HQ	hazard quotient
ID	inside diameter
IDW	investigation derived waste
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
LCS	laboratory control sample
LLPAH	Low-level polycyclic aromatic hydrocarbon
LNAPL	light non-aqueous phase liquid
LOAEL	lowest observed adverse effect level
LRA	Local Redevelopment Authority
LUC	land use control
µg/kg	micrograms per kilogram
µg/L	micrograms per Liter
MATC	Maximum Acceptable Toxicant Concentration
MCL	Maximum Contaminant Level
mean + 2S	mean plus 2 standard deviations
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
NA/NFA	no action or no further action

NAPR	Naval Activity Puerto Rico
NAVFAC	Naval Facilities Engineering Command
NOAEL	no observable adverse effect level
NSRR	Naval Station Roosevelt Roads
OSWER	Office of Solid Waste and Emergency Response
PAH	polycyclic aromatic hydrocarbon
PID	photoionization detector
PREQB	Puerto Rico Environmental Quality Board
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RFI	Resource Conservation and Recovery Act Field Investigation
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RWEC Inc.	Right Way Environmental Contractors, Inc.
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon
TPH	total petroleum hydrocarbons
U.S.	United States
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

SECTION 1

Introduction

This report 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) 67, Naval Activity Puerto Rico (NAPR), in Cieba, Puerto Rico. This Revised Phase I RFI report was prepared under the United States 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 field investigations summarized in this report were completed in response to the Phase I/II Environmental Condition of Property (ECP) Report, which identified SWMU 67 (formerly ECP Site 13) as needing further investigation due to the presence of elevated concentrations of constituents identified during subsurface soil, surface soil, and groundwater sampling (LANTDIV, 2005).

The United States Environmental Protection Agency (USEPA) issued a RCRA § 7003 Administrative Order on Consent (Unites States Environmental Protection Agency [USEPA] Docket No. RCRA-02-2007-7301) to the Navy in 2007 (USEPA, 2007). ECP Site 13 was identified as SWMU 67, with documented releases of solid and/or hazardous waste requiring a Phase I RFI. The Final Phase I RFI Work Plan (Baker, 2007) was approved by the USEPA, and the field investigation was conducted by Michael Baker Jr., Inc. (Baker), in March 2010 (Baker, 2011). A Phase I RFI report for SWMU 67 was finalized in June 2011 (Baker, 2011); however, based on a re-evaluation of the data, and due to the completion of limited additional investigation efforts, a draft revised Phase I RFI report was determined to be warranted and prepared in December 2012, superceding the June 2011 Phase I RFI report (Baker, 2011).

1.1 Objectives and Approach

The Administrative Consent Order (USEPA, 2007) determined that SWMU 67 required additional investigation in the form of a Phase I RFI, based on results of the Phase I/II ECP Report (LANTDIV, 2005). 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) (1994) in the Final RCRA Corrective Action Plan, is to evaluate the nature and extent of hazardous waste releases and gather and evaluate data to support a determination of whether further action is warranted. The SWMU 67 Revised Phase I RFI is intended 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.

To achieve these objectives, a series of evaluations were conducted using the historical site information and environmental data and information collected during the Phase I RFI. The series of evaluations performed on the data are explained in Section 5.

1.2 Report Organization

The Revised Phase I RFI report comprises the following sections:

- Section 1 – Introduction
- Section 2 – Background and Description
- Section 3 – 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. Appendixes are provided after Section 7.

SECTION 2

Background and Description

2.1 NAPR 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, and is 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 period. 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 U.S. treaty with Panama in 1979 that stipulated the U.S. would remove its military presence from Panama, the U.S. 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 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 Navy retains and maintains portions of NAPR in preparation for the sale and transfer of property and to implement Corrective Action obligations in accordance with the Consent Order (USEPA, 2007).

In anticipation of the closure of NSRR 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 to determine if the presence, likely presence, release, or likely release of any hazardous substance or petroleum product had occurred. 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 67 (formerly ECP Site 13), in the form of a Phase I RFI.

2.2 SWMU 67 Description and Previous Investigations

2.2.1 Site Description

SWMU 67 consists of approximately 2.5 acres located south of the airfield on the east side of Langley Drive, near the intersection of Munda Street, and was initially designated as ECP Site 13 (Figure 2-2). The site boundary was established based on the available data for NAPR at the time of the Phase I ECP report and was estimated using the information gathered during the Phase I ECP investigation, including a review of records, historical aerial photographic analysis, physical site inspections, and personal interviews, but was not based on the characterization of the site (LANTDIV, 2004).

The SWMU 67 area is mostly level and covered with secondary growth vegetation (LANTDIV, 2005). Current surface features include a small parking area, two tennis courts, a concrete pad, and a building foundation just north of the tennis courts. The building foundation is from a building that was reportedly used as a ship service

gas station and the concrete pad may have been a service center for vehicle maintenance; however, no evidence of a fuel storage tank ever existing at the site has been discovered (LANTDIV, 2004), and the petroleum-related constituent data collected at the site are not indicative of the past presence of fuel storage tanks. The remnant of a potential vehicle maintenance pit is located within the building foundation and extends to a depth of approximately 8 feet (ft) below ground surface (bgs). An 8-inch drainage pipe is located near the bottom of the north end of the pit; the drain pipe extends north and discharges in an earthen drainage swale. The swale drains the area of SWMU 67, as well as a larger regional area of the facility topographically upgradient of SWMU 67.

2.2.2 Previous Investigations

2.2.2.1. Phase I ECP (LANTDIV, March 2004)

The following information has been added to Section 2.2.2: The Phase I ECP consisted of records review, aerial photography analysis, interviews, and physical site inspections (PSIs). The records review during the ECP included reviewing records (including historical maps) from NAVFAC Atlantic, NSRR, National Archives Offices in Washington D.C. and College Park, Maryland, and other federal contractors to obtain historical information. Additionally, a commercial database search was conducted for federal, commonwealth agency, and local records. Registered USTs and Leaking USTs databases were among the databases included in the records search. No USTs were identified at SWMU 67 during the records search. The aerial photography analysis consisted of analysis of aerial photography obtained from multiple sources covering 1936 through 1999. The aerial photography analyses were used to identify any notable surface features; track the history of NSRR operation; and verify the history, location, and extent of previously identified sites of known or suspected contamination. The aerial photography analysis resulted in identification of a building that was suspected to have been used as gas station, but no evidence of the presence of tanks in the area was identified. The interviews were conducted with current and future employees of the NSRR PWD and operational and environmental managers, shop chiefs, and shop personnel associated with the various organizations and tenants on station. The interviews were conducted to collect information on current and historical activities conducted at NSRR, that status of known environmental resource areas and contaminated sites, potential new areas of environmental concern, and past uses of various sites that had been identified during the aerial photography analysis and PSIs. The results of the interviews indicated that the area north of the tennis courts had been used as a gas station. The PSIs consisted of visual inspections for any signs of a release of hazardous substances or petroleum products including: signs of soil staining and stressed vegetation; unusual odors, such as petroleum or other chemicals; ASTs or USTs; local depressions (possibly indicative of tanks or other buried objects) or fill material that could conceal waste; and oily sheen or unusual appearances of surface water. None of these visual signs were observed during the PSIs at SWMU 67."

2.2.2.2. Phase II ECP (LANTDIV, July 2005)

A Phase II ECP was conducted to determine if an environmental release had occurred as a result of site activities and whether potential releases posed any threat to human health (LANTDIV, 2005). During the physical site inspection, a concrete pad and building foundation were identified within the secondary vegetative growth north of the tennis courts, and a downgradient drainage swale was observed north of the structures. A fuel storage tank was not located during the site inspection and no stressed vegetation was identified.

Three soil borings were advanced at 2-foot intervals down to groundwater, which ranged between 15 and 20 ft below the ground surface (bgs) (LANTDIV, 2005). One subsurface soil sample was collected from each of the three soil borings (Figure 2-3). Subsurface soil sample depths ranged from 7 to 11 ft bgs. A flame ionization detector was used to screen the samples in the field for organic vapors and to aid in selection of the groundwater sampling locations. Temporary monitoring wells were installed in the two southernmost borings and groundwater samples were collected, one sample from each of the wells. The samples were collected using the low-flow sampling technique. The soil and groundwater samples were sent to an offsite laboratory for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganic constituents (dissolved inorganics for groundwater), and total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO). VOCs, SVOCs, TPH, and inorganics were detected at concentrations above the USEPA Risk Based Screening Criteria in April 2004. Therefore, the Phase II ECP report concluded the site was likely impacted by historical releases, and additional investigation was recommended.

Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP
Naval Activity Puerto Rico Boundary
Road
Expressway

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

N

0 1 2 Miles

1 inch = 1 mile

FIGURE 2-1
Site Location Map and Historical Site Layout
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL.

R:\USNavyPuertoRico20000317\MapFiles\SWMU_67\2015_RevisedRFI\Figure_2-1_SWMU67_SiteLocationMap.mxd 2/25/2015 JCarr_ch2mhillenvgis

Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
Ditch/Swale
Storm Sewer Line
2010 Field Delineated Wetland
Esturine Wetland
Concrete Pad/Building Foundation
Former Vehicle Maintenance Pit
SWMU 67 Boundary as Defined in Phase I ECP

N

0 95 Feet
1 inch = 95 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 2-2
Site Features
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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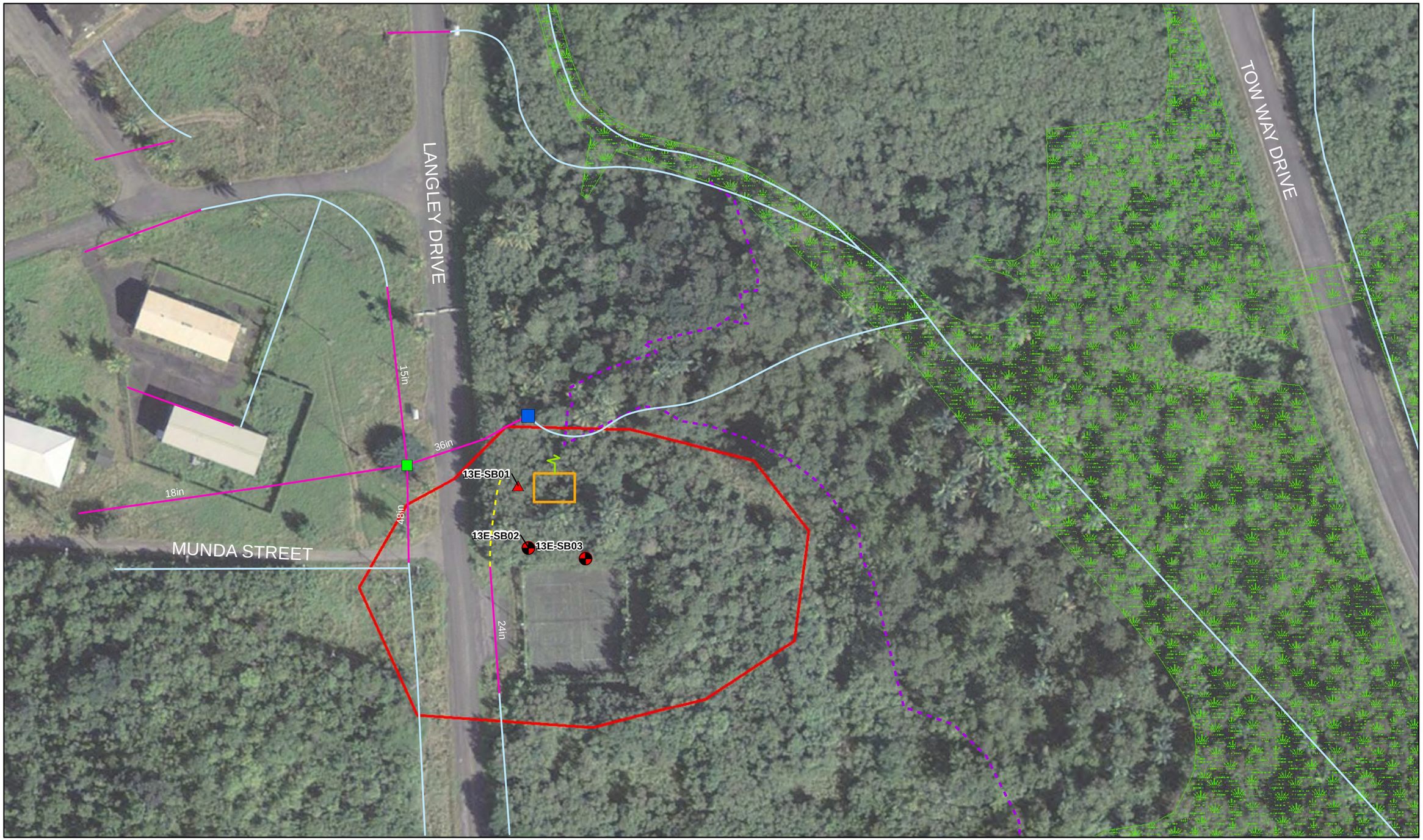

ECP Subsurface Soil Sample Location
ECP Subsurface Soil and Groundwater Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

N

0 95 Feet
1 inch = 95 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 2-3
ECP Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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DVR \\MANAGED.LOCAL\CRITIGEN\PROJECTS\USNAVYPUERTORICO_SWMU67_20000819\MAPFILES\SWMU 67 PHASE I RFI\FIGURE 2-3 - CURRENT SITE LAYOUT AND ECP SAMPLE LOCATION MAP.MXD CELEFTHERIADIS 5/8/2012 10:48:15 AM

SECTION 3

Phase I RFI Activities

The Phase I RFI field investigation was completed in March 2010 (Baker, 2011). Field activities included utility and vegetation clearance, installation of permanent groundwater monitoring wells, and collection of surface soil, subsurface soil, groundwater, and surface water samples. In addition, a wetland delineation was conducted as a result of discrepancies between the delineation conducted in 1999 and field observations made during the Phase I RFI. A site survey and management of investigation-derived waste (IDW) were completed as part of the demobilization activities.

The Draft Revised Phase I RFI for SWMU 67 was submitted in December 2012. As a result of discussions held between USEPA, EQB, and the Navy in February 2013, a geophysical investigation was conducted to determine the existence of a UST and additional sampling of subsurface soil was performed to investigate whether the elevated level of cobalt found in one sample (SB01, shown in **Figure 3-1**) during the Phase I RFI (Baker, 2011) extended beyond the immediate area around the sample. The geophysical and subsurface soil sampling investigations were conducted in February 2014 and July 2014. Field work was conducted in accordance with the Final Work Plan for SWMU 67 (Baker, 2007) and the Geophysical Survey and Additional Subsurface Soil Sampling Technical Memorandum Work Plan (CH2M HILL, 2013a).

This section summarizes the activities that took place during the 2010 and 2014 field investigations and discusses any deviations from the Final Work Plan (Baker, 2007; CH2M HILL, 2013a). Copies of the field notes from the investigations and supporting documents and forms are located in **Appendix A**, and the wetland delineation report is provided in **Appendix B**.

3.1 2010 Phase I RFI Field Activities

3.1.1 Mobilization

Prior to initiation of the 2010 subsurface investigation field activities, utility clearance and vegetation clearance were completed. Base utility maps did not indicate any utilities at SWMU 67. An ASV RC-100 skid steer equipped with a Magnum Systems, Inc. mulcher, operated by Right Way Environmental Contractors, Inc. (RWEC Inc.), was used to clear vegetation in order for the drill rig to reach the sampling locations (Baker, 2011). After clearing a sampling area, proposed sampling points were located using a Global Positioning System (GPS) and marked with wooden stakes and survey flags.

3.1.2 Wetland Delineation

Sampling and analysis in the Phase I RFI Work Plan (Baker, 2007) included surface soil samples from the drainage swale located just north of the site boundary to determine if the drainage swale was potentially acting as a transport pathway for contaminant migration from the former gas station into the adjacent wetland.

The 1999 GeoMarine wetland delineation identified one E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) wetland unit approximately 250 feet northeast of the SWMU 67 boundary. Prior to conducting field sampling activities in March 2010, a field inspection of the wetland boundary was conducted and discrepancies were noted, prompting the need to revise the wetland delineation. The revised delineation, conducted in March 2010, identified an E2FO3 (estuarine, intertidal, forested, broad-leaved evergreen) wetland immediately adjacent to SWMU 67 (with a very small portion [0.01 acre] located within the SWMU boundary) (Baker, 2011). This area had previously been designated as upland habitat. The E2FO3 wetland boundary identified in the 2010 field delineation is depicted on Figure 3-1. The E2SS3 wetland unit previously identified was not verified during the 2010 delineation since the objective was to identify and revise the wetland boundary as it related to SWMU 67. The reclassification of the upland habitat to wetland habitat resulted in designating the proposed drainage swale surface soil samples as “sediment” samples (67SD01 through 67SD05) since they were either within the wetland boundary or located in a small pool of standing water. The four samples collected from the drainage swale downgradient of the stormwater outfall were at the same locations originally designated in the Work Plan (as soil

samples) and were termed “estuarine sediment” samples since it was thought that this area was irregularly flooded from the estuarine habitat (Ensenada Honda) downgradient of the wetland. A fifth sample was collected at the downgradient end of the stormwater outfall upgradient of the forested estuarine wetland and termed a “freshwater sediment” sample since it was collected from a small pool of stormwater runoff (about 8 feet long and 4 feet wide) that had formed where the outfall empties.

Although the five samples from the northern drainage swale were designated as sediment samples for the purposes of sampling, they are most accurately classified as wetland soil, not sediment samples, since the duration and frequency of flooding does not appear to be sufficient for true sediment conditions to develop. Soils in the estuarine wetland near the site are saturated near the surface, due primarily to a high water table plus some infrequent flooding, and the presence of standing water appears to be infrequent and transitory. The pool immediately downgradient of the stormwater outfall appears to contain water on a more frequent basis since it occurs in a small topographical depression but is very small (about 8 feet long by 4 feet wide at the time of sampling) and shallow (maximum of 2 feet deep at the time of sampling). This small pool was the only area that Baker (2011) considered as having the potential to support lower trophic level aquatic receptors (such as benthic macroinvertebrates, fish, and amphibians), although none were observed in the pool when samples were collected, and the pool was considered to represent an intermittent aquatic habitat. Further, this drainage swale does not appear to be directly connected with the onsite drainage feature located on the western side of the site, instead receiving surface (stormwater) runoff from offsite areas west (upgradient) of the site via the stormwater outfall and irregular flooding from the downgradient estuarine habitats associated with Ensenada Honda. For these reasons, the “sediment” samples are evaluated in this document as soil samples.

3.1.3 Field Sample Collection

Twenty one soil samples were collected from fifteen sampling stations at SWMU 67, including the five samples collected from the northern drainage swale discussed in the previous subsection. Eight permanent monitoring wells were installed, co-located with soil boring/sampling locations, and a groundwater sample was collected from each of the monitoring wells. One surface water sample was collected from a drainage culvert at the SWMU. Sampling stations are shown on **Figure 3-1**, and a sample summary is provided as **Table 3-1**. A summary of sampling activities by medium is provided as follows.

3.1.3.1. Soil

Surface Soil

Fifteen surface soil samples were collected: eight from soil boring locations (67SB01 through 67SB08), five from the drainage swale (67SD01 through 67SD05), and two from an earthen drainage feature (67SS01 and 67SS02). The sampling station locations are shown on **Figure 3-2**.

- Samples 67SB01 through 67SB08 were collected at a depth between 0 and 1 ft bgs using a 4-ft Geoprobe Macro-Core Sampler with disposable, clear acetate liners. The Sampler was advanced using a track-mounted direct-push technology (DPT) rig (Geoprobe 6610 DT right operated by GeoEnviroTech, Inc., of San Juan, Puerto Rico). One location (67SB08) was relocated 50 ft west-northwest from the location proposed in the work plan due to DPT refusal.
- Samples 67SS01 and 67SS02 were collected at a depth between 0 and 1 ft bgs using disposable stainless steel spoons. These samples were not outlined in the Work Plan but were determined to be necessary to characterize a potential contaminant migration pathway based on observations of the drainage feature during field reconnaissance.
- Samples 67SD01 through 67SD05 were collected at a depth between 0 and 0.25 ft bgs using a disposable stainless steel spoon. Four of the samples were collected from the drainage swale originally selected in the Work Plan, and one sample was collected at the stormwater outfall upgradient of the forested estuarine wetland, as noted in Section 3.2.

The surface soil samples were transferred directly into pre-labeled, laboratory-provided sample jars (using a Terra Core transfer tool to the VOA vial), immediately after cutting the liner and screening the sample. Samples were

then placed in coolers containing ice. The surface soil samples were collected with minimal disturbance in accordance with laboratory preparation Method 5035. Following collection of a portion of the surface soil in the jars for VOC and TPH GRO analysis, the remaining surface soil for each sample was homogenized prior to collection of the drainage ditch soil in the jars for the remaining analyses. The surface soil samples were shipped in coolers with chain-of-custody forms (**Appendix A**) to the fixed-base analytical laboratory for analysis. All of the samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs with low-level polycyclic aromatic hydrocarbons (LLPAHs), TPH DRO/GRO, and Appendix IX metals, and the drainage ditch samples were additionally analyzed for total organic carbon (TOC), as outlined in the Work Plan (Baker, 2007).

Subsurface Soil

Sixteen subsurface soil samples were collected in March 2010, two samples at differing depths from each of the eight soil boring locations. The sampling station locations are shown on **Figure 3-3**. Soil boring location 67SB08 was relocated 50 ft west-northwest due to DPT refusal. Soil cores were collected using DPT; specifically, a 4-foot Geoprobe MC Sampler and disposable, clear acetate liners were used. The cores were screened in the field for organic vapors using a photoionization detector (PID) equipped with an 11.7-electron-volt (eV) probe calibrated to isobutylene. The PID readings were recorded on the soil boring logs (Appendix A). The field screening procedure for soil samples collected using the DPT MC Sampler involved making a longitudinal cut along the entire length of the MC liner, separating the two edges of the liner, and screening the entire length of the soil core with a PID at approximately 0.5 foot intervals (Baker, 2011). Measureable organic vapors above background levels were not observed from any of the soil cores or during the general PID air monitoring (Baker, 2011); therefore, one sample was collected in the shallow subsurface from 1 to 3 ft bgs, and the second sample was collected above the anticipated water table interface at an interval of 3 to 5 ft bgs, 5 to 7 ft bgs, 7 to 9 ft bgs, or 9 to 11 ft bgs, depending on the location.

The subsurface soil samples were collected in pre-labeled, laboratory-provided sample jars and placed in coolers containing ice. They were shipped in the coolers with chain-of-custody forms (**Appendix A**) to an offsite analytical laboratory for analysis. All of the subsurface soil samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs (with LLPAHs), TPH DRO/GRO, and Appendix IX metals, as outlined in the Work Plan (Baker, 2007).

3.1.3.2. Groundwater

Monitoring Well Installation

Eight monitoring wells were installed (67GW01 through 67GW08), one at each of the soil boring locations. The locations of the monitoring wells are shown on **Figure 3-4**. The locations were selected in order to determine potential impacts of former SWMU 67 activities to groundwater, especially in the vicinity of the former site structure. Seven of the monitoring wells were installed in the locations identified in the Work Plan (Baker, 2007), and one (67GW08) was relocated 50 ft west-northwest due to soil boring refusal. **Table 3-2** summarizes the soil boring and monitoring well specifications.

Each monitoring well was installed using hollow-stem auger drilling and constructed of 2-inch inside diameter (ID), schedule 40 polyvinyl chloride (PVC) screen and riser with flush-jointed threads (Baker, 2011). Screens were 10 ft in length and were set at the necessary depth interval to straddle the water table at each location. The annular space around the well screen was backfilled with a well-graded, fine to medium sand. The sand was extended to approximately 2 ft above the top of the screened interval and an approximately 2-ft thick sodium bentonite seal hydrated with potable water was placed above the sand pack. The annular space above the bentonite seal was filled with a cement and bentonite grout to prevent surface water from infiltrating into the screened zone. An expandable water-tight locking cap with a vent hole was placed at the top of the casing. The wells were completed with three feet of stickup above the ground surface inside approximately 3 ft of steel protective casing. The protective casing was placed over the riser and surrounded by a concrete pad approximately 2 ft long, 2 ft wide, and 6 inches deep. Steel bollards painted yellow for visibility were installed around all of the concrete pads. Well construction diagrams are provided in **Appendix A**.

Following installation, each monitoring well was developed using a decontaminated bailer. A minimum of three well volumes were bailed from each of the monitoring wells, meeting the development criteria. During this process, wells 67GW02 and 67GW05 were identified as low yielding (Baker, 2010). These wells required a period of recharge during development to remove the necessary three well volumes. Following well development, each monitoring well was fitted with a padlock.

Groundwater Sampling

A groundwater sample was collected from each of the eight new monitoring wells. The samples were collected using a decontaminated bladder pump and low-flow sampling techniques (Baker, 2011), with the exception of the samples from 67GW02 and 67GW05, which were collected using the bladder pump only due to insufficient groundwater yield during development. 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**). In accordance with the SAP, the following procedures were performed to ensure stability of groundwater samples:

- Clarity of water based on visual determination
- A maximum time period (typically two hours for shallow wells)
- A maximum borehole volume (typically three to five borehole volumes plus the amount of any water added during the drilling or installation process)
- Stability of pH, specific conductance, and temperature measurements (typically less than 10 percent change between three successive measurements)
- Clarity based on turbidity measurements [typically less than 20 Nephelometric Turbidity Units (NTU)]"

All of the water quality field parameter measurements indicated stability in the final measurements, with the possible exception of turbidity at 67GW04, which was slightly outside of the suggested 10 percent range.

The groundwater samples were collected into pre-labeled, laboratory-provided sample jars. The groundwater was field-filtered for the samples collected for dissolved metals analysis. The samples were placed in coolers containing ice and shipped with chain-of-custody forms (**Appendix A**) to an offsite analytical laboratory for analysis. All of the groundwater samples were analyzed for Appendix IX VOCs, Appendix IX SVOCs (with LLPAHs), TPH DRO/GRO, and total and dissolved Appendix IX metals, in accordance with the Work Plan.

Depth-to-water was measured from the top of the PVC riser to the water table and recorded for each monitoring well prior to and following groundwater sampling activities. Groundwater level measurements are recorded in the field notes (Appendix A) and summarized in **Table 3-2**. In addition, an oil-water indicator was used to evaluate the presence of light non-aqueous phase liquids (LNAPLs). LNAPLs were not observed at any of the wells (Baker, 2011).

3.1.3.3. Surface Water Sampling

One surface water sample (67SW03) was collected just within the 36-inch culvert outlet (**Figure 3-5**). The sample was collected by the direct-dip method, using a 1-liter, laboratory-certified clean, unpreserved amber glass bottle (Baker, 2011). The sample was then decanted into a laboratory-supplied container and placed in a cooler containing ice. The sample cooler was shipped with a chain-of-custody form (**Appendix A**) to an offsite analytical laboratory for analysis. The surface water collected for dissolved metals analysis was field-filtered prior to sample collection. The sample was analyzed for Appendix IX VOCs, Appendix IX SVOCs (with LLPAHs), TPH DRO/GRO, and total and dissolved Appendix IX metals.

Surface water sampling was not included in the Work Plan (Baker, 2007), but was conducted as the result of the identification of standing water at a 36-inch culvert which receives stormwater effluent from areas upgradient (west) of SWMU 67. There are several structures within this area of NAPR, including Building 207 (SWMU 80), approximately 1,800 ft northwest; however, it appears that there are not any drainage ditches or stormwater features leading from SWMU 80 that are directly linked or associated with the 36-inch culvert. Because it was

judged that the 36-inch culvert could receive significant amounts of water during persistent rainfall events, the surface water sample was collected to further evaluate possible contaminant migration to the site (Baker, 2011). Although surface water may drain toward the culvert area from the site, it likely discharges to the drainage swale east of the culvert and is transported downgradient; therefore, the presence of water within the culvert is most likely reflective of transport from other areas of the facility through the storm sewer system. There were no other identified areas of standing water within SWMU 67 or the E2FO3 wetland area (Baker, 2011), and the culvert area is too small and the water too transitory to provide suitable habitat for aquatic receptors. Therefore, the surface water data collected from this culvert were used in this Revised Phase I RFI Report to qualitatively evaluate upgradient, non-site-related contributions to SWMU 67, and are not used to quantify risk associated with SWMU 67 releases.

3.1.3.4. Quality Assurance and Quality Control Sampling

Quality assurance/quality control (QA/QC) samples were collected in accordance with the Work Plans (Baker, 2011). A summary of the QA/QC samples collected and their analyses is provided in **Table 3-1**.

- **Field Duplicates** - Two surface soil field duplicate samples, two subsurface soil field duplicate samples, and one groundwater field duplicate sample were collected.
- **Trip Blanks** - One trip blank sample was included in each cooler containing the samples from the site, for a total of five trip blanks.
- **Matrix Spike/Matrix Spike Duplicates (MS/MSDs)** - One set of surface soil MS/MSD samples, one set of subsurface soil MS/MSD samples, and one set of groundwater MS/MSD samples were collected.
- **Field Blanks** - Two field blank samples were collected; one from laboratory-grade deionized water used for equipment rinsate samples and one from store bought distilled water used for decontamination purposes.
- **Equipment Rinsate Blanks** - Eight equipment rinsate blanks were collected, one per day for each piece of equipment.

3.1.4 Surveying

A mapping-grade Differential Global Positioning System (DGPS) (satellite DGPS corrections from Omnistar or “real-time”) was used to survey the earthen drainage feature and a portion of the estuarine wetland boundary in March 2010. The corners of the tennis courts and centerline of Langley Drive were also recorded as additional points of reference. The U.S. State Plane 1983, Puerto Rico/Virgin Island 5200, and North American Datum 1983 coordinate systems were used to record these positions using feet as units.

A sub-consultant to Baker, Transystem Corporation, conducted a multi-site survey at NAPR on March 30 through April 1, 2010, at SWMUs 57, 61, 67, and 75. SWMU 67 was surveyed using Real-Time Kinematic GPS and conventional survey methods after the permanent monitoring wells were installed. Real-Time Kinematic GPS surveying employs a GPS base station and a GPS rover that reads satellite carrier phase signals, and this was utilized on areas of the site that were open to satellites. Conventional survey methods were used where portions of the site were covered by vegetative canopy, hindering satellite communication. These methods were selected because of the accuracy of the data they produce that can be used for groundwater contour mapping. The accuracy of these methods (in feet) is as follows:

Real-Time Kinematic GPS: +- 0.08 Vertical, +/- 0.05 Horizontal

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

Each monitoring well at SWMU 67 was surveyed for an elevation at the top of the PVC riser and a ground surface elevation in order to calculate water level elevations. Surface soil sample locations 67SS01 and 67SS02, the corners of the tennis courts, and the corners of the culverts were also surveyed by Transystem Corporation.

3.1.5 Investigation-Derived Waste Management

IDW generated during the 2010 field investigation consisted of drill cuttings from the soil borings and monitoring well installations, well development and purge water, and decontamination fluids. The IDW was containerized in 55-gallon drums. One composite soil sample (67IDW01) was collected from drums containing drill cuttings, and one composite aqueous sample (67IDW02) was collected from drums containing development and purge water and decontamination fluid. The IDW samples were 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 March 31, 2011.

3.2 2014 Phase I RFI Field Activities

3.2.1 Geophysical Survey

In January 2014, a geophysical survey was performed at SWMU 67. A metal detector (Fisher Laboratories TW-6 all-metals detector [TW-6]), ground-penetrating radar (Geophysical Survey Systems, Inc. SIR-3000 system with a 400-megahertz antenna), and radiodetection tools (Cable Avoidance Tool (CAT) and radiodetection RD8000) were used to conduct the geophysical investigation at SWMU 67. The objective of the geophysical survey was to evaluate whether a UST was present within the vicinity of the suspected former gas station, and to determine whether the 8-inch pipe observed in the drainage swale during previous investigations was the outlet end to the pipe observed at the base of the maintenance pit. The ground-penetrating radar survey was conducted in two orthogonal directions across the concrete pad, and did not identify subsurface anomalies consistent with a UST.

The geophysical survey area (depicted in **Figure 3-6**) encompassed the area east of Langley Drive and north of and adjacent to the abandoned tennis courts. The TW-6 did not identify anomalies indicative of a UST in this area. Anomalies identified throughout the survey area were found to be associated with the concrete pad and metallic trash on the ground surface. Isolated subsurface anomalies encountered throughout the survey area exhibited a very small footprint that would not be consistent with a UST. The metallic response from the pad indicated that it is either reinforced or is constructed of aggregate with a high metallic mineral content.

The CAT and RD8000 were unable to detect the outfall pipe because it was non-metallic. and, at the location where it exited the pad, it was at a depth greater than the reception range of these radiodetection tools. Therefore, alternative means were used to locate the outlet. CH2M HILL field personnel fastened a metal hand tool to the end of a sturdy branch and lowered it down the maintenance pit to tap the inside of the exposed pipe. A second field team member listened at the partially exposed pipe opening in the drainage swale and confirmed hearing the tapping noise through the pipe, thereby determining that the pipe at the base of the maintenance pit was the same pipe exposed in the swale.

3.2.2 Subsurface Soil Sampling

A summary of the field activities associated with the subsurface soil sampling field activities conducted in January and July 2014 is provided as follows.

- **Mobilization** - A utility clearance and vegetation clearance was performed by GeoEnvirotech prior to performing the subsurface sampling in July 2014.
- **Subsurface Soil Sampling** - Subsurface soil sampling was conducted in January and July 2014 for analysis of cobalt only in the vicinity of 67SB01, near the former maintenance pit. Due to dense subsurface ground conditions, only one subsurface sample could be obtained in January 2014. The field team remobilized in July 2014, and seven subsurface soil samples (six from 5 to 7 feet bgs and one from 7 to 9 feet bgs) were collected using direct-push technology in the vicinity of soil sample 67SB01 and analyzed for cobalt (**Figure 3-3**). The subsurface soil samples were collected in pre-labeled, laboratory-provided sample jars and placed in coolers containing ice. The coolers were shipped with chain-of-custody forms (**Appendix A**) to an offsite analytical laboratory for analysis.

- **QA/QC –** Quality assurance/quality control (QA/QC) samples were collected in accordance with the Work Plan (Baker, 2011). A summary of the QA/QC samples collected and their analyses is provided in **Table 3-1**.
  - **Field Duplicates** - Two subsurface soil field duplicates were collected for cobalt only; one was collected in January 2014, and one was collected in July 2014 during the additional subsurface soil cobalt sampling investigation.
  - **MS/MSDs –**Two subsurface soil MS/MSD samples were collected for cobalt only; one was collected in January 2014, and one was collected in July 2014 during the additional subsurface soil cobalt sampling investigation.
  - **Equipment Rinsate Blanks** - One equipment rinsate blank was collected in January 2014, and one was collected in July 2014 for analysis of cobalt only, during the additional subsurface soil cobalt sampling investigation.
- **Surveying** - Soil sample locations were surveyed using a Trimble GPS at the time of the sample collection.
- **Investigation-Derived Waste Management** - Soil cuttings were placed back into the borehole, and the limited amount of decontamination fluid was allowed to evaporate; therefore no IDW was generated during the additional Phase I RFI Activities.

TABLE 3-1
Summary of Sampling and Analytical Program
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Sample Media	Station ID	Sample ID	Sample Depth (ft)	Sample Date	Analysis Requested										Comments
					Appendix IX VOCs	Appendix IX SVOCs (with LLPAHs)	Appendix IX Metals (Total)	Appendix IX Metals (Dissolved)	Total Organic Carbon	TPH DRO	TPH GRO	TCLP VOCs	TCLP Metals	RCI	
Surface Soil	67SB01	67SB01-00	0.0 - 1.0	3/24/2010	X	X	X			X	X				
	67SB02	67SB02-00	0.0 - 1.0	3/25/2010	X	X	X			X	X				
		67SB02-00MS/MSD	0.0 - 1.0	3/25/2010	X	X	X			X	X				Matrix Spike/Matrix Spike Duplicate
	67SB03	67SB03-00	0.0 - 1.0	3/26/2010	X	X	X			X	X				
	67SB04	67SB04-00	0.0 - 1.0	3/25/2010	X	X	X			X	X				
	67SB05	67SB05-00	0.0 - 1.0	3/24/2010	X	X	X			X	X				
	67SB06	67SB06-00	0.0 - 1.0	3/23/2010	X	X	X			X	X				
	67SB07	67SB07-00	0.0 - 1.0	3/23/2010	X	X	X			X	X				
	67SB08	67SB08-00	0.0 - 1.0	3/22/2010	X	X	X			X	X				
		67SB08-00D	0.0 - 1.0	3/22/2010	X	X	X			X	X				Duplicate
	67SS01	67SS01	0.0 - 1.0	3/30/2010	X	X	X			X	X				
	67SS02	67SS02	0.0 - 1.0	3/30/2010	X	X	X			X	X				
	67SD01	67SD01	0.0 - 0.5	3/22/2010	X	X	X		X	X	X				
		67SD01D	0.0 - 0.5	3/22/2010	X	X	X			X	X				Duplicate
		67SD01MS/MSD	0.0 - 0.5	3/22/2010	X	X	X			X	X				Matrix Spike/Matrix Spike Duplicate
	67SD02	67SD02	0.0 - 0.5	3/22/2010	X	X	X		X	X	X				
	67SD03	67SD03	0.0 - 0.5	3/22/2010	X	X	X		X	X	X				
	67SD04	67SD04	0.0 - 0.5	3/22/2010	X	X	X		X	X	X				
	67SD05	67SD05	0.0 - 0.5	3/22/2010	X	X	X		X	X	X				
Subsurface Soil	67SB01	67SB01-01	1.0 - 3.0	3/24/2010	X	X	X			X	X				
		67SB01-01D	1.0 - 3.0	3/24/2010	X	X	X			X	X				Duplicate
		67SB01-03	5.0 - 7.0	3/24/2010	X	X	X			X	X				
	67SB02	67SB02-01	1.0 - 3.0	3/25/2010	X	X	X			X	X				
		67SB02-02	3.0 - 5.0	3/25/2010	X	X	X			X	X				
	67SB03	67SB03-01	1.0 - 3.0	3/26/2010	X	X	X			X	X				
		67SB03-04	7.0 - 9.0	3/26/2010	X	X	X			X	X				
	67SB04	67SB04-01	1.0 - 3.0	3/25/2010	X	X	X			X	X				
		67SB04-01MS/MSD	1.0 - 3.0	3/25/2010	X	X	X			X	X				Matrix Spike/Matrix Spike Duplicate
		67SB04-03	5.0 - 7.0	3/25/2010	X	X	X			X	X				
	67SB05	67SB05-01	1.0 - 3.0	3/24/2010	X	X	X			X	X				
		67SB05-05	9.0 - 11.0	3/24/2010	X	X	X			X	X				
	67SB06	67SB06-01	1.0 - 3.0	3/23/2010	X	X	X			X	X				
		67SB06-01D	1.0 - 3.0	3/23/2010	X	X	X			X	X				Duplicate
		67SB06-05	9.0 - 11.0	3/23/2010	X	X	X			X	X				
	67SB07	67SB07-01	1.0 - 3.0	3/23/2010	X	X	X			X	X				
		67SB07-05	9.0 - 11.0	3/23/2010	X	X	X			X	X				
	67SB08	67SB08-01	1.0 - 3.0	3/23/2010	X	X	X			X	X				
		67SB08-05	9.0 - 11.0	3/23/2010	X	X	X			X	X				
	W67-SB09	W67-SB09-0507MS/MSD	5.0 - 7.0	1/24/2014			X[1]								Matrix Spike/Matrix Spike Duplicate
		W67-SB09P-0507	5.0 - 7.0	1/24/2014			X[1]								Duplicate
		W67-SB09R-0507	5.0 - 7.0	7/3/2014			X[1]								
		W67-SB09RP-0507	5.0 - 7.0	7/3/2014			X[1]								Duplicate
	W67-SB10	W67-SB10-0507	5.0 - 7.0	7/3/2014			X[1]								
	W67-SB11	W67-SB11-0507	5.0 - 7.0	7/3/2014			X[1]								
	W67-SB12	W67-SB12-0507	5.0 - 7.0	7/3/2014			X[1]								
	W67-SB12	W67-SB12-0709	7.0 - 9.0	7/3/2014			X[1]								
	W67-SB13	W67-SB13-0507	5.0 - 7.0	7/3/2014			X[1]								
	W67-SB14	W67-SB14-0507MS/MSD	5.0 - 7.0	7/3/2014			X[1]								Matrix Spike/Matrix Spike Duplicate

TABLE 3-1
Summary of Sampling and Analytical Program
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Sample Media	Station ID	Sample ID	Sample Depth (ft)	Sample Date	Analysis Requested										Comments
					Appendix IX VOCs	Appendix IX SVOCs (with LLPAHs)	Appendix IX Metals (Total)	Appendix IX Metals (Dissolved)	Total Organic Carbon	TPH DRO	TPH GRO	TCLP VOCs	TCLP Metals	RCI	
Groundwater	67SB01	67GW01	NA	3/27/2010	X	X	X	X		X	X				
	67SB02	67GW02	NA	3/28/2010	X	X	X	X		X	X				
	67SB03	67GW03	NA	3/30/2010	X	X	X	X		X	X				
	67SB04	67GW04	NA	3/28/2010	X	X	X	X		X	X				
	67SB05	67GW05	NA	3/27/2010	X	X	X	X		X	X				
	67SB06	67GW06	NA	3/27/2010	X	X	X	X		X	X				
	67SB07	67GW07	NA	3/26/2010	X	X	X	X		X	X				
	67SB08	67GW08	NA	3/26/2010	X	X	X	X		X	X				
		67GW08D	NA	3/26/2010	X	X	X	X		X	X				Duplicate
		67GW08MS	NA	3/26/2010	X	X	X	X		X	X				Matrix Spike
		67GW08MSD	NA	3/26/2010	X	X	X	X		X	X				Matrix Spike Duplicate
Surface Water	67SW03	67SW03	NA	3/22/2010	X	X	X	X		X	X				
QA/QC - Trip Blanks	NA	67TB01	NA	3/22/2010	X						X				
	NA	67TB02	NA	3/24/2010	X						X				
	NA	67TB03	NA	3/26/2010	X						X				
	NA	67TB04	NA	3/26/2010	X						X				
	NA	67TB05	NA	3/30/2010	X						X				
QA/QC - Equipment Rinsate Blanks	NA	67ER01	NA	3/22/2010	X	X	X			X	X				Stainless Steel Spoon
	NA	67ER02	NA	3/23/2010	X	X	X			X	X				Macro Core Liner
	NA	67ER03	NA	3/23/2010	X	X	X			X	X				Macro Core Liner
	NA	67ER04	NA	3/25/2010	X	X	X			X	X				Macro Core Liner
	NA	67ER05	NA	3/26/2010	X	X	X			X	X				Macro Core Liner
	NA	67ER06	NA	3/27/2010	X	X	X			X	X				Groundwater Sample Tubing
	NA	67ER07	NA	3/28/2010	X	X	X			X	X				Groundwater Sample Tubing
	NA	67ER08	NA	3/30/2010	X	X	X			X	X				Stainless Steel Spoon
	NA	W67-EB01	NA	1/24/2014			X[1]								Macro Core Liner
	NA	W67-EB01	NA	7/3/2014			X[1]								Macro Core Liner
QA/QC - Field Blanks	NA	67FB01	NA	3/23/2010	X	X	X			X	X				Lab Grade Deionized Water
	NA	67FB02	NA	3/25/2010	X	X	X			X	X				Store Bought Distilled Water
Investigation Derived Waste	NA	67IDW01	NA	3/30/2010	X		X							X	Solid
	NA	67IDW02	NA	3/30/2010								X	X	X	Aqueous

Notes:
[1] Analyzed for cobalt only
VOC - volatile organic compound
SVOC semivolatile organic compound
LLPAH - Low-level Polycyclic Aromatic Hydrocarbon
TPH DRO - total petroleum hydrocarbons diesel range organics
TPH GRO - total petroleum hydrocarbons gas range organics
TCLP - toxicity characteristics leaching potential
RCI - reactivity, corrosivity, ignitability

TABLE 3-2

Summary of Soil Borings, Monitoring Well Specifications, and Water Level Elevations

SWMU 67 Revised Phase I RFI

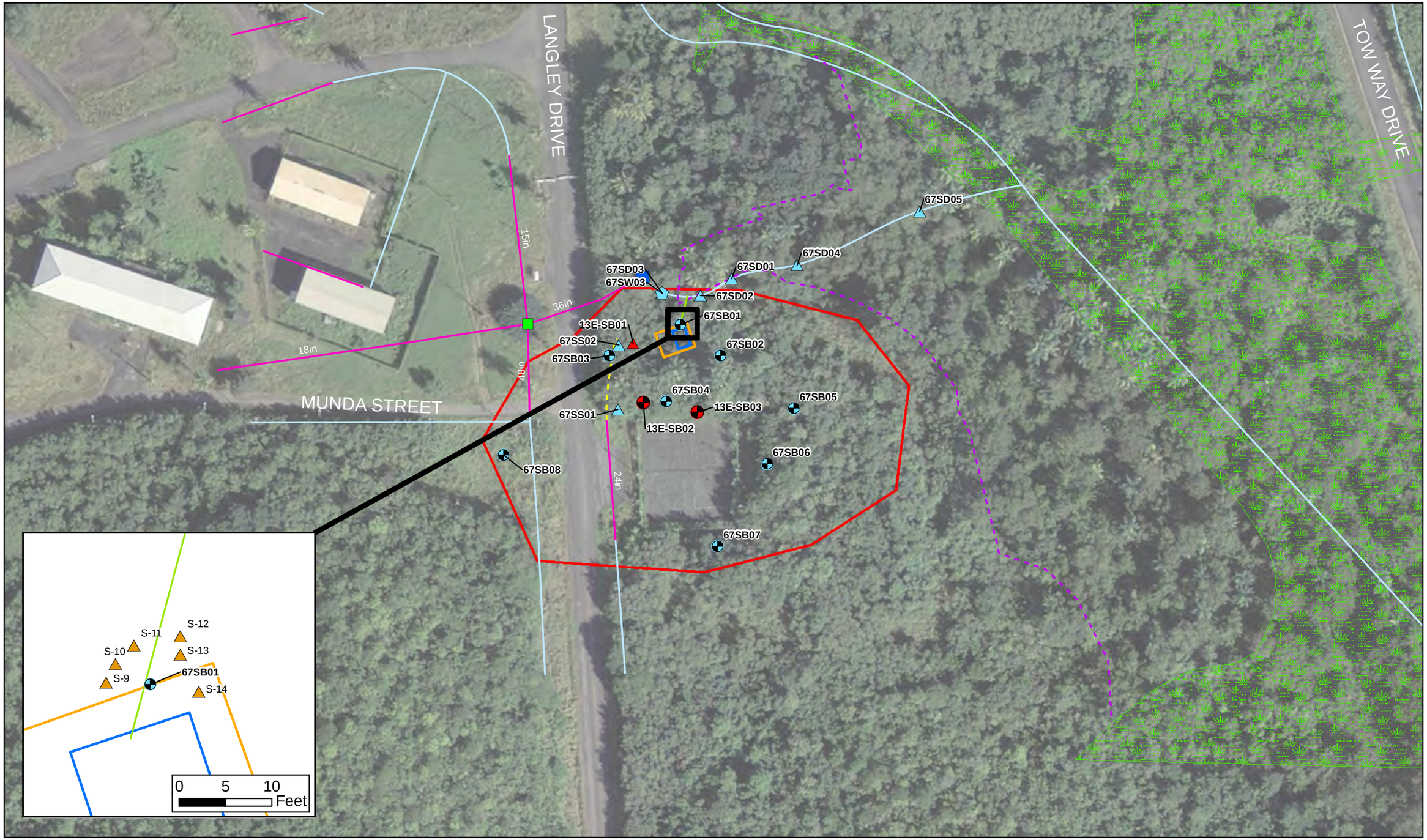
Naval Activity Puerto Rico

Soil Boring Monitoring Well Designation	Date Installed	Ground Elevation (ft. datum)	Top of PVC Elevation (ft. datum)	Borehole Depth		Well Depth		Screened Interval		Groundwater Level March 31, 2010		Groundwater Level April 25, 2010	
				Feet (approx. bgs)	Elev. (ft. datum)	Feet (approx. bgs)	Elev. (ft. datum)	Feet (approx. bgs)	Elev. (ft. MSL)	Feet (below top of PVC casing)	Elev. (ft. datum)	Feet (below top of PVC casing)	Elev. (ft. datum)
67SB01	3/24/2010	112.3	115.5	16.0	96.3	13.0	99.3	3-13	9.3 to -0.7	9.21	106.25	9.27	106.19
67SB02	3/25/2010	113.0	116.0	16.0	97.0	13.0	100.0	3-13	10.0 to 0.0	10.68	105.31	10.21	105.78
67SB03	3/26/2010	114.8	117.7	16.0	98.8	15.0	99.8	5-15	9.8 to -0.2	11.34	106.39	11.41	106.32
67SB04	3/25/2010	116.4	119.4	16.0	100.4	16.0	100.4	6-16	10.4 to 0.4	13.00	106.38	13.05	106.33
67SB05	3/24/2010	114.0	117.0	16.0	98.0	16.0	98.0	6-16	8.0 to -2.0	11.92	105.12	11.67	105.37
67SB06	3/23/2010	115.7	118.5	18.0	97.7	18.0	97.7	8-18	7.7 to -2.3	14.88	103.57	12.84	105.61
67SB07	3/23/2010	118.2	121.0	20.0	98.2	20.0	98.2	10-20	8.2 to -1.8	14.94	106.10	15.03	106.01
67SB08	3/22/2010	119.3	122.1	20.0	99.3	20.0	99.3	10-20	9.3 to -0.7	15.28	106.85	15.45	106.68

Notes:

bgs = below ground surface

The datum plan used is the Mean Low Water + 100.00 foot as established by the U.S. Navy Survey Section (November 1941).



Phase I RFI Soil and Groundwater Sample Location
Phase I RFI Surface Soil Sample Location
Phase I RFI Surface Soil/Surface Water Location
ECP Subsurface Soil Sample Location
ECP Subsurface Soil and Groundwater Sample Location
Additional Phase I RFI Subsurface Soil Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Concrete Pad/Building Foundation
Former Vehicle Maintenance Pit
SWMU 67 Boundary as Defined in Phase I ECP
Esturine Wetland

N

0 100 Feet

1 inch = 100 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-1
ECP and RFI Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL.

R:\USNavyPuertoRico20000317\MapFiles\SWMU_67\2015_RevisedRFI\Figure_3-1_ECP_RFI_SampleLocations.mxd 2/25/2015 JCarr_ch2mhillenvgis

Phase I RFI Surface Soil Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

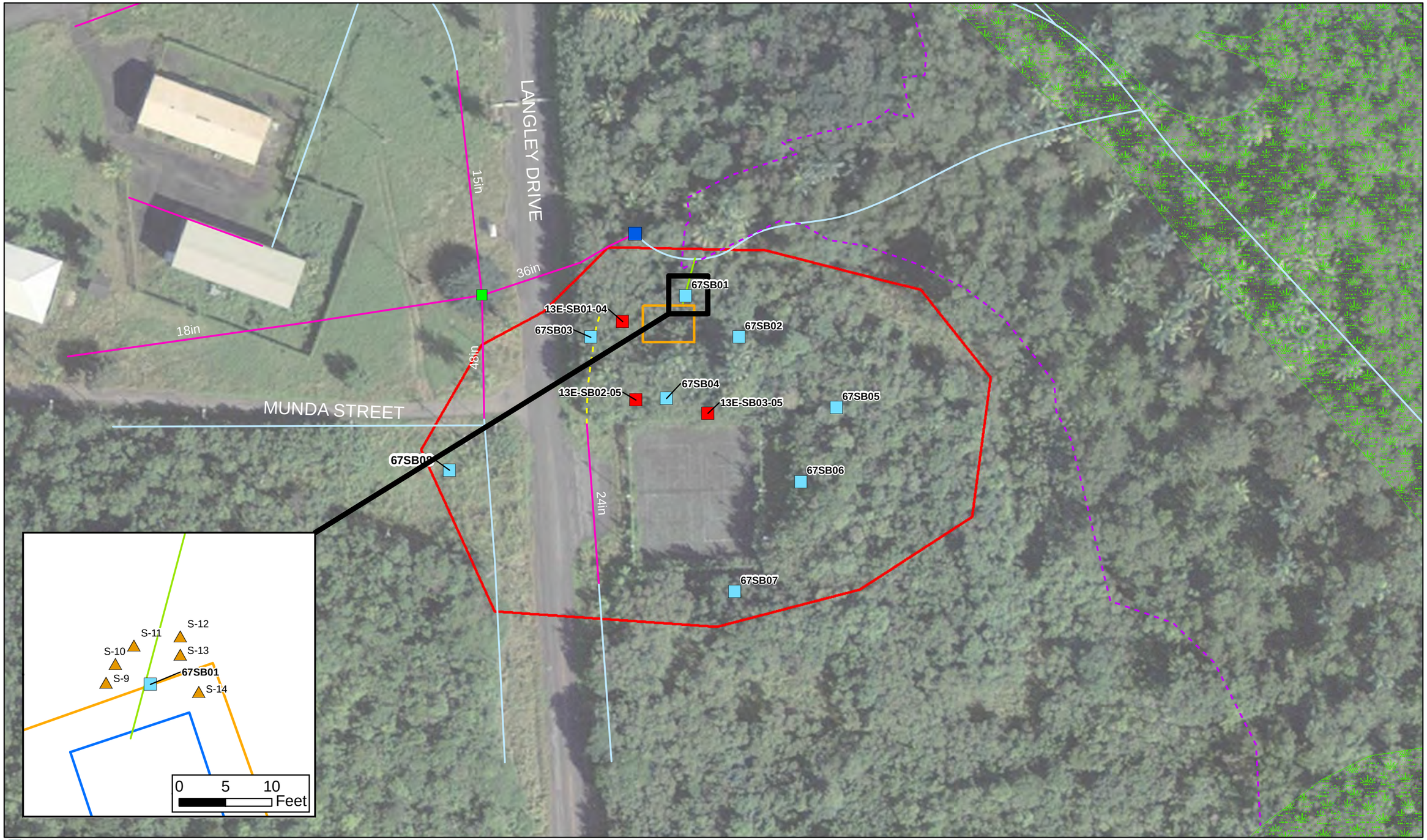
N
0 100 Feet
1 inch = 100 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-2
Surface Soil Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL

DVR \\MANAGED.LOCAL\CRITIGEN\PROJECTS\USNAVYPUERTORICO_SWMU67_20000819\MAPFILES\SWMU 67 PHASE I RFI\FIGURE 3-2 - SURFACE SOIL SAMPLING LOCATIONS.MXD CELEFTHERIADIS 5/8/2012 11:20:33 AM



ECP Subsurface Soil Sample Location
Phase I RFI Subsurface Soil Sample Location
Inlet
Culvert
Additional Phase I RFI Subsurface Soil Sample Location
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

N
0 75
Feet
1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-3
Suburface Soil Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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ECP Groundwater Sample Location
Phase I RFI Groundwater Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

N

0 75 Feet

1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-4
Groundwater Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

Phase I RFI Surface Water Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined by Phase I ECP

N

0 75 Feet

1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-5
Surface Water Sample Locations
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

DVR \\MANAGED.LOCAL\CRITIGEN\PROJECTS\USNAVYPUERTORICO_SWMU67_20000819\MAPFILES\SWMU 67 PHASE I RFI\FIGURE 5-6 - GROUNDWATER EXCEEDANCES OF SCREENING CRITERIA - INORGANIC COMPOUNDS.MXD CELEFTHERIADIS 5/8/2012 11:33:20 AM

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Geophysical Survey Line
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
Ditch/Swale
Storm Sewer Line
Concrete Pad/Building Foundation
Former Vehicle Maintenance Pit
Geophysical Survey Area
SWMU 67 Boundary as Defined in Phase I ECP

N

0 100 Feet

1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 3-6
Geophysical Survey Investigation Area
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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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 effect on the tropical heat, resulting in minimal temperature fluctuations seasonally and a mean temperature of 79.9 degrees Fahrenheit (°F) (LANTDIV, 2005). NAPR maintains a relatively moderate humidity, with the average between 65% and 78%. 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, and slopes of 60 percent. Topography within NAPR varies from the coastline to the western boundary, with elevations ranging from sea level to approximately 297 ft above mean sea level. 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 which outfall into the Caribbean Sea. The Daguao River and Quebrada Seca Stream are the two watersheds which 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. In addition, development in the outlying town of Ceiba has lead to significantly more surface water runoff into NAPR, causing ponding and erosion (LANTDIV, 2005).

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 67 Characteristics

4.2.1 Topography and Hydrology

SWMU 67 is primarily inland flat land, which is typically underlain by relatively thick, predominantly clay residuum (LANTDIV, 2005). Runoff from Langley Drive, the tennis courts, and the small parking area is conveyed through a system of culverts and an earthen drainage swale toward the forested wetland area east of SMWU 67, as seen in **Figure 2-2** (Baker,2011). The earthen drainage swale runs approximately north for 165 feet. Beyond the earthen drainage swale, there is no other evidence of other swales or drainage areas that would provide movement of surface water further, and it does not appear to provide any connection to other resources nearby.

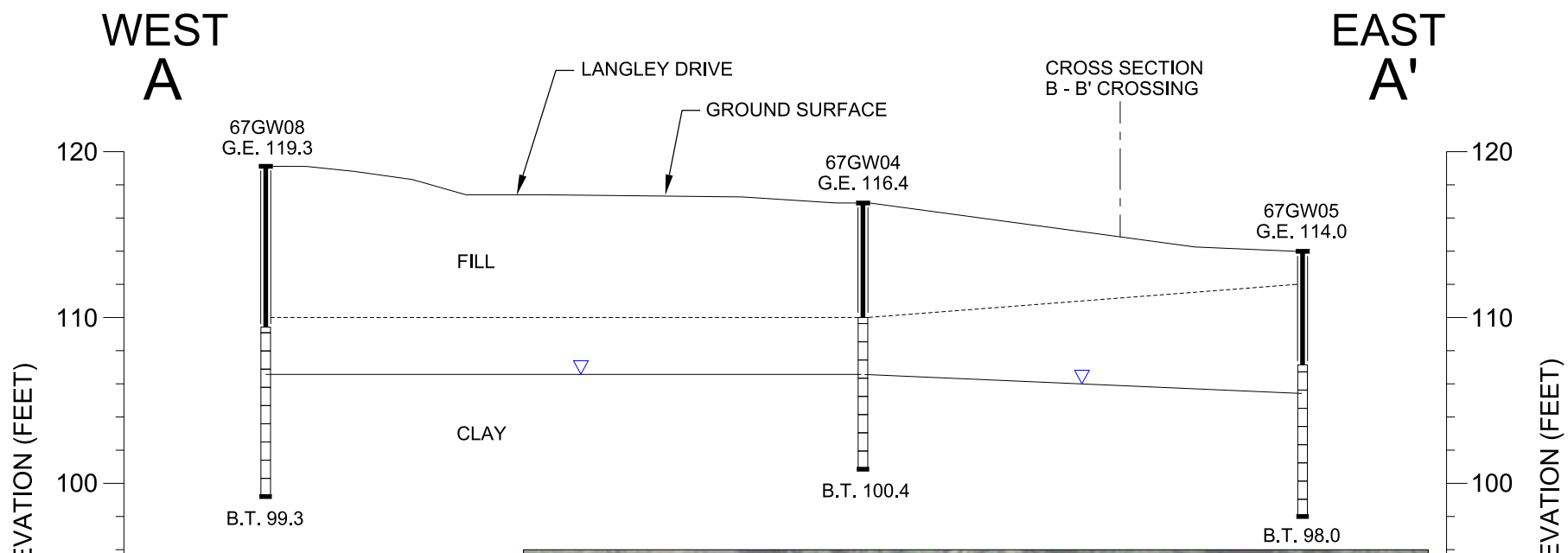
4.2.2 Geology and Hydrogeology

The soil type at SWMU 67 is predominately Jacana clay. The subsurface geology at SWMU 67 comprises clay, sand and gravel fill, with some lenses of beach sand, including coral and shells, and has a thickness ranging from approximately 1.6 to 9 ft bgs, underlain by saprolite (Baker, 2011). Hydrostratigraphic cross-sections depicting the subsurface geology of SWMU 67 are shown on **Figures 4-1** and **4-2**. Groundwater is encountered approximately 7 to13 ft bgs in saprolite, with the exception of 67GW02 on the eastern portion of the site, where groundwater is situated within the fill (7 ft bgs). The groundwater potentiometric surface gradient is approximately 0.004 ft per ft, and flow is directed toward the forested estuarine wetland area to the east. The potentiometric surface map was developed using the April 25, 2010 water level measurements, and is provided as **Figure 4-3**.

4.2.3 Land Uses and Resources

Although a portion of SWMU 67 was used for recreational purposes, the SWMU is located in an industrial area of the facility, just south of the air field. Reportedly, the area was historically used as a “ship service gas station”, although no evidence of a fuel storage tank has been discovered during records searches and interviews (LANTDIV, 2004) or during the geophysical survey performed in January 2014. Future land use at SWMU 67 is expected to become a “Town Center” incorporating retail, residential and institutional development (LRA, 2010. NAPR sites can be transferred with land use controls (LUCs) in place, and potential reuse plans can be limited by the LUCs (Navy, 2012), if necessary. Any changes to the LUCs of transferred property would be handled between the new owner and the USEPA. Restricted media and land uses for SWMU 67 will be determined at the conclusion of the investigation, prior to land transfer.

Water at NAPR is currently supplied by a water treatment system which 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). Specifically, groundwater at SWMU 67 is not likely suitable for potable use due to both the low yield of the water-bearing unit and the high dissolved solids in the groundwater. The potential yield from the water-bearing unit is low, as documented in the Phase I RFI Report: “Wells 67SB02 and 67SB05 were identified as low yield during development. These wells required a period of recharge between development to remove the required three well volumes.” Further, the specific conductivity of the groundwater at the site ranges from 2.3 to 4.9 ms/cm, or approximately 2,770 mg/L (Standard Methods for the Examination of Water and Wastewater 20th edition, 1999). Since EPA has established a Secondary Maximum Contaminant level for TDS at 500 mg/L, 2,770 mg/L TDS observed in the groundwater at SWMU 67 indicates that groundwater would most likely be naturally discolored, contain excessive dissolved minerals, and have a salty taste (i.e., not suitable for potable use without treatment).



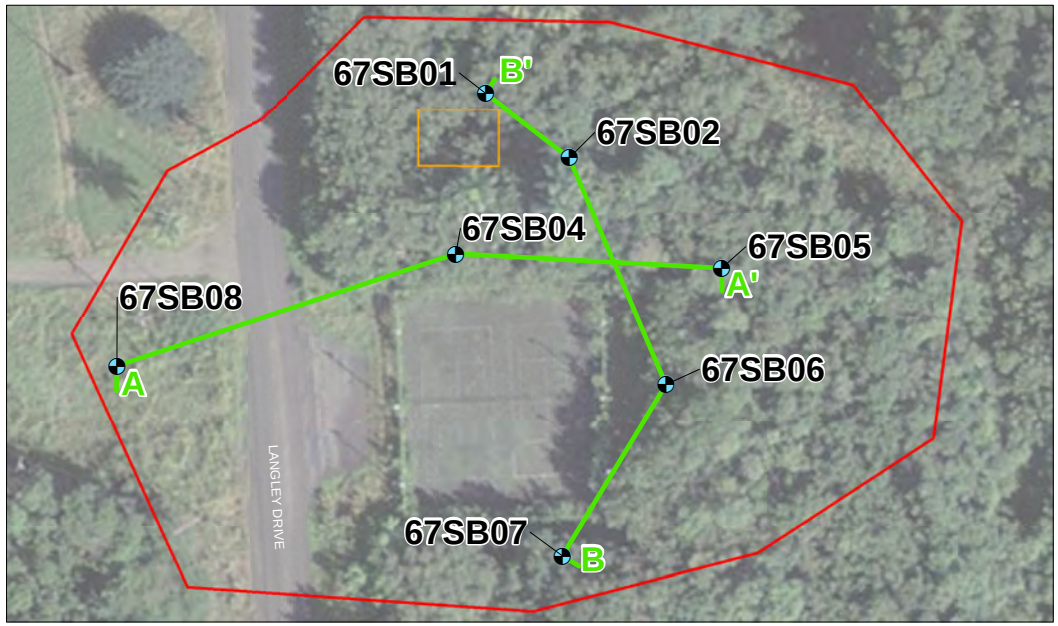
LEGEND:

- = ESTIMATED / PROJECTED CONTACT
- = ESTIMATED TOP OF GROUNDWATER
- = BORING
- = BORING AND RISER
- = SCREEN
- G.E. 112.3 = GROUND ELEVATION, DATUM ELEVATION
- B.T. 96.3 = BORING TERMINATED, DATUM ELEVATION

0 50 Feet
HORIZONTAL SCALE:
1 inch = 50 feet

0 10 Feet
VERTICAL SCALE:
1 inch = 10 feet

VERTICAL EXAGGERATION = 5X



N 0 35 Feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

NOTES:

1. GEOLOGIC SOIL UNITS:

   FILL: FINES AND GRAVEL MIX, MOSTLY LOOSE, SOME SHELLS IN THE FILL SANDS.

   CLAY: BROWN AND GRAY, MOIST, YELLOW AND BLACK MOTTLING, MEDIUM PLASTICITY, AND SOME SILTS (SAPROLITE).

2. LITHOLOGY FROM SOIL BORING LOGS IN BAKER JUNE 2011.

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

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

FIGURE 4-1
Geologic Cross Section A - A'
SWMU 67 - Former Gas Station
Phase I RFI
Naval Activity Puerto Rico

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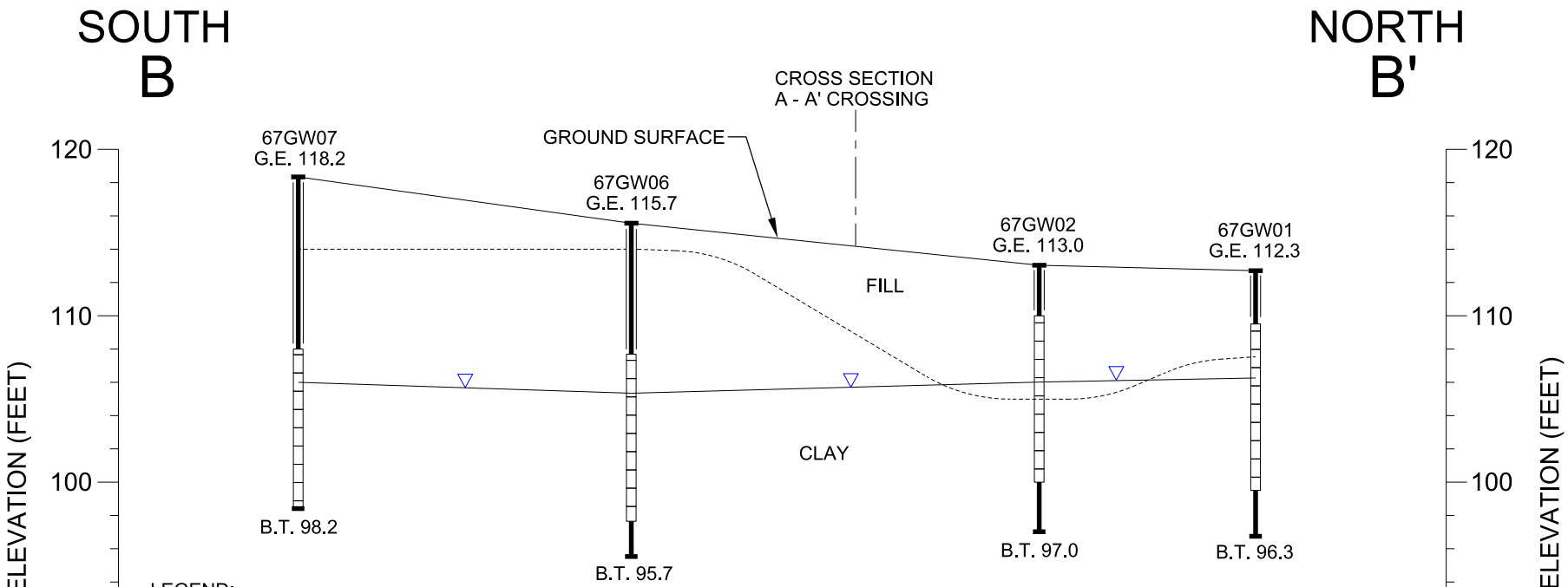

LEGEND:

- = ESTIMATED / PROJECTED CONTACT
- = ESTIMATED TOP OF GROUNDWATER
- = BORING
- = BORING AND RISER
- = SCREEN
- G.E. 112.3 = GROUND ELEVATION, DATUM ELEVATION
- B.T. 96.3 = BORING TERMINATED, DATUM ELEVATION

0 50 Feet
HORIZONTAL SCALE:
1 inch = 50 feet

0 10 Feet
VERTICAL SCALE:
1 inch = 10 feet

VERTICAL EXAGGERATION = 5X

N 0 35 Feet
Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

NOTES:

1. GEOLOGIC SOIL UNITS:

   FILL: FINES AND GRAVEL MIX, MOSTLY LOOSE, SOME SHELLS IN THE FILL SANDS.

   CLAY: BROWN AND GRAY, MOIST, YELLOW AND BLACK MOTTLING, MEDIUM PLASTICITY, AND SOME SILTS (SAPROLITE).

2. LITHOLOGY FROM SOIL BORING LOGS IN BAKER JUNE 2011.

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

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

FIGURE 4-2
Geologic Cross Section B - B'
SWMU 67 - Former Gas Station
Phase I RFI
Naval Activity Puerto Rico

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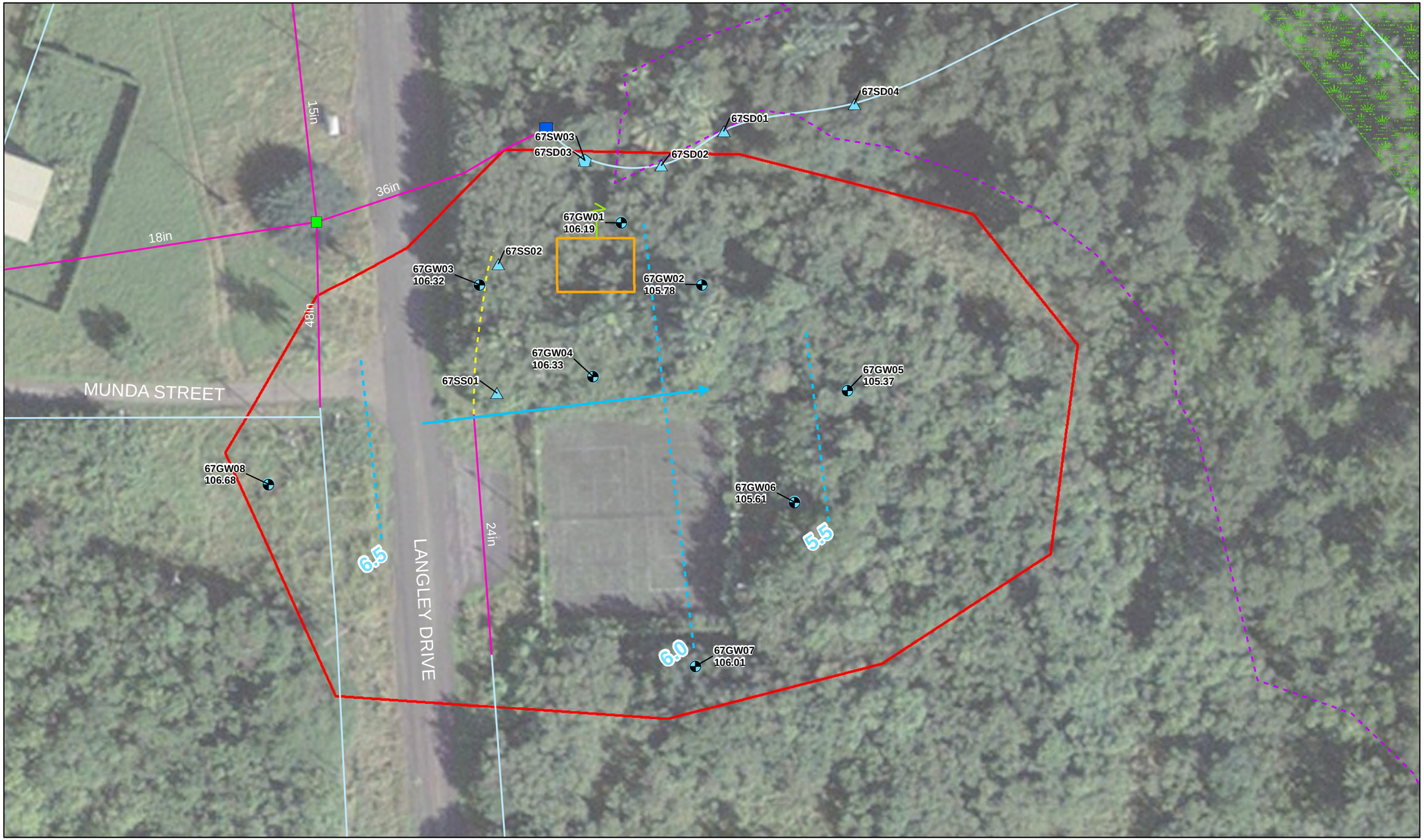

Phase I RFI Soil and Groundwater Sample Location
Phase I RFI Surface Soil Sample Location
Phase I RFI Surface Soil/Surface Water Sample Location
Inlet
Culvert
Groundwater Elevation Contour
Groundwater Flow Direction
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

N

0 50 Feet
1 inch = 50 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 4-3
Groundwater Potentiometric Surface
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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DVR \\MANAGED.LOCAL\CRITIGEN\PROJECTS\USNAVYPUERTORICO_SWMU67_20000819\MAPFILES\SWMU 67 PHASE I RFI\FIGURE 4-3 - GROUNDWATER CONTOUR MAP.MXD CELEFTHERIADIS 5/8/2012 11:44:25 AM

SECTION 5

Analytical Results and Data Evaluation

The Administrative Consent Order (USEPA, 2007) determined that SWMU 67 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 (also referred to as a Release Assessment) 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.

The information and data for SWMU 67 were evaluated using a 6-step decision analysis process modified from a decision analysis process jointly developed by USEPA, Puerto Rico Environmental Quality Board (PREQB), and the Navy for sites undergoing release assessment on Vieques (CH2M HILL, 2010a), and is appropriate for use at NAPR because it presents the information to achieve the goal of a Phase I RFI (OSWER, 1994). The data evaluation process for SWMU 67 is presented in **Figure 5-1**, and a detailed explanation of the process is provided as follows.

Step 1—Data Quality Evaluation

The purpose of this step is to determine if the data quality evaluation indicates the dataset as a whole is available and useful for its intended purpose. The data quality evaluation assesses the effect of the overall analytical process on the "availability" of the analytical data. "Availability" in this context refers to whether results can be used by the project team based on their analytical soundness. If a result is analytically sound, it is available for use for evaluating potential releases and whether further investigation or action is warranted. However, a particular result or group of results may not be "usable" for these purposes if other conditions apply (for example: non-conformances in initial and continued calibrations, or low recovery in laboratory control samples [LCSs]).

The three major categories of data availability evaluation are laboratory performance, field collection performance (such as blank contamination), and matrix interferences. The data evaluation and validation is a multi-tiered approach. The process begins with an internal laboratory review, continues with an independent review by a third-party validator, and ends with an overall review by the Navy contractor project chemistry team. While only the data validator is allowed to apply qualifiers to the data, the process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

The data usability evaluation comprises critical assessment of the data with respect to the project objective. Given that the primary objective of the Phase I RFI is to determine if there has been a release, and, if so, whether the release warrants further investigation or action, the comprehensive dataset is reviewed to determine if it is spatially adequate (in Step 6 of the decision analysis process) for making the project-specific determinations (i.e., was the potential source area sufficiently characterized).

Step 2—Release Assessment

The purpose of this step is to determine if there has been a potential RCRA-related release at a particular site. A release assessment through a Phase I RFI may be performed following a RCRA Facilities Assessment/ECP prior to initiation of a full RFI. The release assessment helps determine if further investigation is warranted through a full RFI, if interim/stabilization measures are necessary, or if no further investigation or action is warranted.

A potential release is suspected if any inorganic constituents inconsistent with background concentrations are detected or if any non-inorganic constituents are detected. For the purposes of the Revised Phase I RFI Report, the background soil inorganics used for comparison are those contained in the Background Threshold Value Evaluation and Recommendations for Naval Activity Puerto Rico, Technical Memorandum (CH2M HILL, 2013b). As discussed in the 2013 Background Technical Memorandum (CH2M HILL, 2013b), background values were calculated as the 95 percent upper confidence limits of the 95th percentile (known as 95/95 UTLs), and are considered background threshold values (BTVs). To help determine whether site-specific inorganics

concentrations are inconsistent with background inorganics concentrations, discrete sample concentrations are compared to the BTVs for individual inorganics. It is important to note, however, that the conclusion of whether inorganic concentrations present at a particular site are the result of a release or likely attributable to background may not be based solely on the BTVs comparisons. In fact, including other information in this evaluation may increase the confidence upon which the conclusion is drawn. Given that the ultimate goal is to ensure releases are identified and appropriately addressed, the more information available upon which to make the assessment, the higher the degree of confidence in the assessment. Depending on site-specific circumstances, other information may include a consideration of the magnitude of concentrations exceeding the BTVs as well as conclusions from other statistical comparisons (such as quantile, slippage, and central tendency comparisons, which are also referred to as population-to-population comparisons). Additional information may also include historical knowledge of constituents potentially released during past site activities.

It is important to emphasize the distinction between the use of background in a “release assessment” versus a “risk assessment.” In the Phase I RFI phase, one of the primary objectives is to determine whether a release has occurred, such that the need for further investigation or action can be appropriately assessed. Therefore, it is critical that background be considered upon initial evaluation of site-specific data. In other words, whether a potential release occurred can be determined only if site-specific data are evaluated relative to background (e.g., for inorganics). On the other hand, when a risk assessment is performed, such as during a full RFI, a release has already been determined to have occurred and the risk assessment is performed to evaluate the potential risks based on the nature and extent of the contaminant release. In that circumstance, background is considered only after the potential risks posed by all constituents of potential concern are evaluated, in accordance with USEPA policy.

It is also important to note that identifying a “suspected release” does not necessarily mean a RCRA-related release has occurred. Nor does it mean that even if a release has occurred that the release warrants further investigation or action. Additional evaluation, such as historical site information consideration and comparison of site-specific data to screening criteria, is used to refine the understanding of the “suspected release.” This additional evaluation is the subject of the remaining decision analysis steps, described as follows. If a release is not suspected, a determination is made whether the suspected source area was sufficiently sampled (see Step 6 as follows). If so, a no action or no further action (NA/NFA) determination is recommended; if not, collection of additional samples or interim action is recommended.

Step 3—Determination of Whether a Suspected Release is Potentially RCRA-related

For any inorganic constituent inconsistent with background or for any detected non-inorganic constituent, historical site-specific information, as well as constituent-specific information is considered to help determine whether the constituent’s presence is potentially from a RCRA-related release. In other words, some constituents may be present because of something other than a RCRA-related release and are, therefore, not subject to RCRA regulation. If constituents are detected that are determined not to be RCRA-related, they may be addressed under other regulatory programs, as applicable.

Step 4—Comparison to Conservative Screening Values

If a RCRA-related release is suspected, site-specific data (that exceed background) are compared to conservative screening values, which comprise (as applicable):

- USEPA Regional Screening Levels (RSLs) for residential or industrial land use (adjusted for a non-cancer hazard quotient [HQ] of 0.1, as applicable) – January 2015 update
- Soil screening levels (SSLs) at a dilution attenuation factor (DAF) of 1 (meaning there is no dilution attenuation at all; the concentration at the receptor point is the same as that in the soil leachate)
- Federal Maximum Contaminant Levels (MCLs)
- Puerto Rico Water Quality Standards

- Ecological soil screening values for plants and soil invertebrates. The screening values for soil invertebrates and plants are applied to sites that contain complete exposure pathways to soil organisms. Some of these sites also contain suitable habitat of sufficient size to warrant an evaluation of terrestrial food web exposures to bioaccumulative chemicals. When an evaluation of both lower and upper trophic level receptors is appropriate for a site, the ecological screening values for plants and invertebrates are used in the Step 4 exceedance table. A more detailed ecological risk evaluation with respect to upper and lower trophic level receptors may be completed in Step 5.

For this report, it is appropriate to compare only those site-specific concentrations above background to risk-based screening criteria, because the objective of the Phase I RFI is to not only determine whether a RCRA-related release has occurred, but also to assess if the release warrants further investigation or action. Background, therefore, must be considered as part of this process.

Step 5—Evaluation of Exceedances Using More Realistic Assumptions

For the screening value exceedances that are likely attributable to a historical RCRA-related release, an evaluation of the data using more realistic assumptions, if possible, is done. This more realistic evaluation is performed to apply appropriate perspective regarding the release such that informed decisions on the need for further investigation or action can be made.

Examples of More Realistic Data Evaluations

Soil to Groundwater Leaching Considerations

One more realistic evaluation that is commonly done where SSL exceedances (at a DAF of 1) are identified is to consider the constituent concentrations in other media. For example, if there are SSL exceedances in the surface soil and there are subsurface and/or groundwater data available in the same area, these additional data are incorporated into the evaluation of the SSL exceedances to help put the exceedances into perspective. Where subsurface and/or groundwater data show the presence of a constituent below screening criteria, the SSL at a DAF of 1 is not likely a realistic predictor of the constituents' leaching through soil to groundwater.

Human Health Risk Evaluation Considerations

Where there are exceedances of the most conservative human health screening criteria, more realistic evaluations are performed that further evaluate the significance of the exceedances from a human health risk standpoint. Based on the number of samples available, the potential type of exposure point concentration (EPC) (maximum concentration or upper confidence limit [UCL]) that might be used in a risk assessment is identified. At the ECP/Phase I RFI stage, it is reasonable to consider other EPCs besides the maximum detected concentration (e.g., the UCL on the mean) for comparison purposes to put screening criteria exceedances into perspective and obtain a general indication of conservative conclusions that may result from a quantitative risk assessment. At the ECP/Phase I RFI stage, samples are collected from areas expected to be the most impacted (i.e., where the potential release likely occurred). Therefore, the constituent concentrations in the dataset are likely biased high for a receptor's exposure area, which would likely result in overestimations of EPCs. If a site is moved to the full RFI stage, a quantitative risk assessment would be conducted, and the EPC for a chemical would be the 95% UCL on the mean concentration (if enough samples are available), in accordance with USEPA guidance, not the maximum concentrations. For sites where comparisons of maximum detected concentrations to risk-based levels indicated the potential for risks above target levels and there were enough samples (for this purpose, at least eight samples with at least four detected concentrations) available to calculate UCLs, USEPA's ProUCL software was used to calculate EPCs for comparison to risk-based concentrations.

For a chemical exceeding the most conservative human health screening level and identified as a constituent of potential concern (COPC) in both surface soil and subsurface soil (or both "total" and "dissolved" groundwater), the higher EPC (maximum detected concentration or 95% UCL on the mean concentration, depending on the size of the dataset) of the two datasets is used to calculate the HQ and excess lifetime cancer risk (ELCR). This conservative approach is used to provide upper-end risk estimates for each site as part of the more realistic evaluation of site data.

The human health evaluation in Step 5 is performed using a conservative assumption of future residential land use. The potential for the presence of a “hot spot” of higher concentrations at the site (in comparison to other areas) is evaluated for the residential scenario. The presence of hot spots is evaluated so that the potential for diluting out higher concentrations in the EPC calculations can be assessed. For this evaluation, a “hot spot” is defined as a sample with a detected concentration exceeding 100 times the RSL.

In addition, the following are considered, as applicable:

- The basis for the screening levels (i.e., carcinogenic or non-carcinogenic effects)
- The applicability of the screening levels to the site (e.g., use of more realistic screening values based on anticipated land use)
- The acceptable target risk range or level at which risk-based decisions would likely be made (e.g., target groundwater concentrations would not be lower than MCLs)

Based on the EPC type, screening level basis, target risk range/level, and extent of exceedances, a conclusion is made regarding whether target risks would likely be exceeded if a risk assessment was prepared. This approach also accounts for cumulative effects from multiple constituents.

When chromium was detected, the human health screening levels for hexavalent chromium (the more toxic form of chromium) are used to identify whether chromium is a COPC for the human health evaluation. However, the quantitative risk estimates for chromium are based on the more realistic assumption that it is present predominantly as trivalent chromium. Although chromium was not speciated in any media to confirm that it would most likely be present in the trivalent form, a discussion of why the trivalent form is the most likely form can be found in Appendix C. Since site-specific speciation data are not available where a site is a candidate for No Action, an additional evaluation of chromium data is performed. This evaluation estimates cancer risks under the health-protective assumption that the maximum detected concentration of chromium is present in the hexavalent form. This also assumes that any person would be exposed to the maximum detected concentration (rather than the more reasonable upper-bound of the average) for the entire exposure scenario. As shown in Appendix C, this health-protective, conservative comparison indicates that exposure to chromium, when evaluated in the hexavalent form, would not exceed the upper-bound of USEPA's acceptable risk range and no adverse health effects would be expected. Since the actual form of chromium present at the site is likely to be a mixture of both forms, but primarily the trivalent form, the actual site risks of even those sites at the upper-bound risk range would not result in adverse health effects since actual site risk is expected to be less than the calculated risk estimates.

Ecological Considerations

The ecological soil screening values are divided into two groups, one for the protection of lower trophic level soil organisms (soil invertebrates and plants) and one for the protection of upper trophic level wildlife (birds and mammals), in accordance with the Vieques ERA Protocol jointly developed by USEPA, PREQB, and the Navy (CH2M HILL, 2010a, as updated in August 2010 [CH2M HILL, 2010b]). Based on the proximity of NAPR and Vieques, and, therefore, the similarity of ecology and ecological conditions, the existing Vieques Ecological Risk Assessment (ERA) Protocol is appropriate for use at NAPR with applicable updates.

For the ecological risk evaluation, bioaccumulative chemicals with maximum surface soil concentrations that exceeded bird or mammal ecological soil screening levels (Eco-SSLs) or did not have bird or mammal Eco-SSLs, were modeled for food web exposures to the Norway rat, Indian mongoose, pearly-eyed thrasher, common ground dove, and red-tailed hawk, in accordance with the Vieques ERA Protocol (CH2M HILL, 2010a, as updated in August 2010 [CH2M HILL, 2010b]). Site-specific food web model calculations and resulting HQs based on 95% UCL and mean soil concentrations are presented.

If it is not possible to perform more realistic evaluations based on existing data, but additional data may facilitate more realistic evaluations (Step 5a), the additional data collection is proposed and the process returns to Step 5 following their collection. If a more realistic evaluation can be performed but the results of the more realistic

evaluation suggests contaminant levels warrant further investigation or action, a determination is made whether an interim action can be implemented to address the contamination or whether an expanded investigation is warranted. While determining the appropriateness of an interim action (versus expanded investigation) will ultimately depend on site-specific conditions, the ultimate goal is to maximize the efficiency and cost-effectiveness of resources in ensuring protectiveness at the site. Factors that may be included in such a determination include type of contamination, media impacted, area of contamination, cost/time of additional investigation versus cost/time of interim action, and logistical considerations of implementing an interim action. For example, if the results of Phase I RFI sampling and evaluation suggest there is a relatively small area of contamination that may pose an unacceptable risk (based on the screening-level risk evaluation), it may be more efficient and cost-effective to invest resources in eliminating the area of contamination potentially posing the unacceptable risk than in performing more quantitative evaluations and risk assessments. Confirmatory samples can always be collected following the interim action to ensure residual concentrations are acceptable.

Background Considerations

In addition, exceedances of BTVs are sometimes further evaluated through comparison of site-specific inorganics concentrations relative to the full range of inorganics detected during the background study, including outliers. It is important to note, however, that these kinds of observations are never solely used to make site-specific determinations regarding the presence of releases and the need for further action; these observations are simply used as part of the comprehensive evaluation performed (i.e., they are one piece of the evidence comprehensively evaluated to make the site-specific determinations).

Step 6—Evaluation of Historical Site Information and Spatial Distribution

As a final check before exiting the Phase I RFI decision analysis with a NA/ NFA determination, the historical site information and spatial distribution of constituents and constituent concentrations are evaluated to ensure the potential source area for a RCRA-related release has been sufficiently characterized. If so, NA/NFA is recommended. If not, additional data collection is recommended, after which the process returns to Step 1.

5.1 SWMU 67 Data Evaluation Results

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

Phase II ECP (2004)

Three subsurface soil samples and two groundwater samples were collected during the ECP study (LANTDIV, 2004). QA/QC samples were collected as part of the ECP study; however, the analytical data were not validated. Therefore, the “B”-qualified data are considered to be non-detects in this evaluation. The raw analytical data are provided in Appendix D. The data are discussed in Steps 2, 3, 4, and 6 as part of the screening value and spatial extent considerations. However, the soil data were collected below 6 ft bgs, and neither the soil nor groundwater results were validated. In addition, more recent groundwater data from permanent monitoring wells were collected from the same general area. Therefore, ECP data were not incorporated into the Step 5 human health and ecological risk evaluations.

Phase I RFI (2010 and 2014)

Following receipt of the analytical data from the laboratory, the data were validated by a third-party data validation subcontractor. The data validation summary reports are provided in **Appendix E**. 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 SMWU 67 activities. The majority of the data is usable with only 4.5% of the total results “R” qualified as rejected. The data quality evaluation performed on the data is provided in **Appendix F**.

Step 2 – Were any inorganics detected above the NAPR background screening values or were any non-inorganics detected?

Analytical data for inorganics were compared to the NAPR background criteria presented in the Background Threshold Value Evaluation and Recommendations for Naval Activity Puerto Rico (CH2M HILL, 2013b). The analytes detected during the ECP and Phase I RFI are shown in **Tables 5-1** through **5-3**. The following summarizes the organic detections and inorganic detections above background.

Surface Soil

- VOCs: Ten VOCs were detected in surface soil (**Table 5-1**).
- SVOCs: Seventeen SVOCs were detected in surface soil (**Table 5-1**).
- TPH: TPH-DRO was detected in surface soil (**Table 5-1**).
- Inorganics: Nine inorganics were detected in surface soil at concentrations conservatively considered exceedances of background values. Seven of these inorganics were detected above the NAPR background value (**Table 5-1**). Two of the 9 inorganics, silver and thallium, do not have established NAPR background values. Silver was not detected in background surface soil samples; therefore, all detections of silver were considered exceedances. A statistical background value could not be established for thallium because it was only detected in one background surface soil sample; therefore, thallium detected in surface soil at concentrations above the single background concentration were considered exceedances.

Subsurface Soil

- VOCs: Eleven VOCs were detected in subsurface soil (**Table 5-2**).
- SVOCs: Seventeen SVOCs were detected in subsurface soil (**Table 5-2**).
- TPH: TPH-DRO was detected in subsurface soil (**Table 5-2**).
- Inorganics: Fifteen inorganics were detected in subsurface soil at concentrations conservatively considered exceedances of background values. Thirteen of these inorganics were detected in subsurface soil above the NAPR subsurface soil-clay background value. Two of the 15 inorganics, antimony and silver, do not have established NAPR soil background values. Statistical background values could not be established for antimony and silver because they each were only detected in one background subsurface soil sample; therefore, antimony and silver detected in subsurface soil at concentrations above their single respective background concentration were considered exceedances.

Groundwater

- VOCs: Five VOCs were detected in groundwater (**Table 5-3**).
- SVOCs: Twelve SVOCs were detected in groundwater (**Table 5-3**).
- TPH: TPH-DRO and TPH-GRO were detected in groundwater (**Table 5-3**), but only in the unvalidated samples collected during the ECP.
- Inorganics: Two inorganics were detected in groundwater at concentrations conservatively considered exceedances of background values. One of these inorganics, vanadium, was detected in groundwater above the dissolved metals NAPR groundwater background value, but was not detected above the total metals NAPR groundwater background value. One of the two inorganics, thallium, does not have an established total or dissolved metals NAPR groundwater background value. Thallium was not detected in background groundwater samples; therefore, all detections of thallium were considered exceedances.

Step 3 – Are there any inorganic constituents above background or non-inorganic constituents that are potentially attributable to a historical RCRA release from SWMU 67?

Based on the potential historical use of the site as a gas station and vehicle maintenance facility, the presence of VOCs, SVOCs, and inorganics in the vicinity of the former building and concrete pad may be attributable to historical RCRA-related releases. However the following considerations are noteworthy:

TPH is not generally considered a RCRA constituent; however, its distribution and concentrations can be used to assess the likelihood of the use of the area as a gas station. For example, if TPH was detected in significant concentrations, the location of former underground storage tanks (USTs) (and use of the area as a gas station) may be suggested. At SWMU 67, TPH slightly exceeded the PREQB UST program screening value of 100 milligrams per kilogram (mg/kg) in soil at one location (67SB05), with a concentration of 110 mg /kg. However, the exceedance occurred in surface soil and TPH did not exceed the PREQB UST program screening value in subsurface soil or groundwater. In fact, no TPH was detected in groundwater during the RFI. LNAPL was not observed during well installation or groundwater sample collection efforts. Additionally, polycyclic aromatic hydrocarbons (PAHs) (which are typically the most toxic fraction of the TPH) were not detected at concentrations that indicate a release occurred above USEPA thresholds, as discussed in further detail in the following sections. All of this information, in conjunction with the lack of geophysical evidence that a UST was present at the site, suggests a release associated with a UST did not occur and that the site may not have been used as a gas station. In fact, the low levels of petroleum constituents detected in site media are likely representative of normal vehicular traffic in and around the site because it is common to detect these constituents at low levels where vehicles and petroleum-related products such as asphalt are present.

Soil boring/monitoring well SB08/67GW08 is west of Langley Drive and upgradient of SWMU 67, so the detected concentrations of VOCs, SVOCs, and inorganics above background at this location are not attributable to releases associated with the SMWU, and are, in fact, more representative of local background, including anthropogenic constituents ubiquitous across the facility or upgradient of SWMU 67. In addition, samples collected in drainage swales conveying runoff from SWMU 67 also convey runoff from areas topographically upgradient of the facility through the storm sewer system. Therefore, the presence of VOCs, SVOCs, and inorganics in samples east of Langley Drive around the tennis courts and in the vicinity of the concrete pad (i.e., at SWMU 67) at similar concentrations to those detected from SB08/67GW08 may represent localized background conditions for the inland flat area. Samples collected within the drainage swales, although influenced by SWMU 67 runoff, may also be representative of background conditions in the inland flat area.

Although considered further in the decision process, the site-wide arsenic concentrations may not be attributable to a release. A 2003 Agency for Toxic Substances and Disease Registry (ATSDR) 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 detected concentrations up to 4.3 mg/kg (Agviq/ CH2M HILL, 2011). Only one surface soil sample and one subsurface sample (collected from 1 to 2 ft bgs) exceeded 4.3 mg/kg at SWMU 67 (5.0 mg/kg). This information suggests that arsenic concentrations in soil at SWMU 67 are wholly or primarily attributable to background.

Several inorganics (barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) were detected in soil above the NAPR background values. The most predominant exceedances of metals occurred in subsurface soil at 67-SB01, adjacent to the potential former gas station/ maintenance pit and concrete pad. Aside from the 67-SB01 areas, there are relatively few and minor concentrations exceeding background. The low frequency and magnitude of inorganic exceedances of background screening values, complimented by the general absence or low levels of organic concentrations, indicate the potential releases from site activities were minimal and may have been due primarily to general use, not RCRA-related releases, especially considering the sampling was biased to the most likely locations of releases and associated contaminant transport pathways, with the exception of the tennis court area. In addition, none of the subsurface soil samples collected in January and July 2014 and analyzed for cobalt exceeded NAPR background values. The subsurface soil samples collected in 2014 determined that the single elevated cobalt concentration

found previously during the March 2010 field investigation is isolated and there is no indication of a release warranting additional investigation or action.

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

In this step of the decision analysis, the detected organic and inorganic constituents detected above the background values were compared to screening values. Soil concentrations were compared to the USEPA residential and industrial soil RSLs and soil-to-groundwater SSLs at a DAF of 1 (meaning there is no dilution/attenuation and the concentration in groundwater is the same as that in the soil leachate). Groundwater concentrations were compared to the Federal MCLs, Puerto Rico Water Quality Standards for Class SG, and the USEPA Tapwater RSLs (adjusted for a target HQ of 0.1, as applicable). Surface soil exceedances were also screened against ecological soil screening values. Those constituents that exceeded one or more criteria (and background for inorganics) are listed by medium, as follows. **Tables 5-1** through **5-3** present the ECP and RFI exceedances of screening criteria for surface soil, subsurface soil, and groundwater, respectively. Sample locations and exceedances of screening criteria are provided on **Figures 5-2** through **5-7**.

Surface Soil (Table 5-1 and Figures 5-2 through 5-3):

- VOCs: No VOCs were detected in surface soil above the screening values.
- SVOCs (Figure 5-2): Four SVOCs were detected in surface soil above screening values.
  - Benzo(a)anthracene was detected at a concentration of 28 micrograms per kilogram (µg/kg) at 67SD01 and 52 µg/kg at 67SD05, above the SSL at a DAF of 1 of 10 µg/kg.
  - Benzo(a)pyrene was detected at a concentration of 70 µg/kg at 67SD05, above the residential RSL of 15 µg/kg.
  - Benzo(b)fluoranthene was detected at a concentration of 110 µg/kg at 67SD05, above the SSL at a DAF of 1 of 41 µg/kg.
  - Dibenz(a,h)anthracene was detected at a concentration of 28 µg/kg at 67SD05, above the residential RSL of 15 µg/kg and SSL at a DAF of 1 of 13 µg/kg.
- Inorganics (Figure 5-3): Nine inorganics were detected in surface soil above NAPR background screening values. Seven of the nine inorganics also exceeded one or more other screening values.
  - Arsenic was detected in surface soil within and adjacent to the earthen drainage swale at a concentration of 2.9 mg/kg at 67SS01 and 5.0 mg/kg at 67SS02, above the residential and industrial RSLs of 0.67 mg/kg and 3.0 mg/kg, respectively, and the SSL at a DAF of 1 of 0.29 mg/kg. As noted in Step 3, arsenic is likely associated with background.
  - Copper was detected at a concentration of 277 mg/kg at 67SB02, above the SSL at a DAF of 1 of 46 mg/kg and the soil screening value for lower trophic level soil organisms of 70 mg/kg.
  - Lead was detected at concentrations ranging from 35.6 mg/kg to 134 mg/kg, above the SSL at a DAF of 1 of 14 mg/kg at three locations and above the soil screening value for lower trophic level soil organisms of 120 mg/kg at one of those locations.
  - Mercury was detected at a concentration of 0.17 mg/kg at 67SB08, slightly above the SSL at a DAF of 1 of 0.1 mg/kg and the soil screening value for lower trophic level soil organisms of 0.1 mg/kg. This detection is slightly above the background value of 0.131 mg/kg.
  - Selenium was detected at concentrations ranging from 1.2 mg/kg to 2.2 mg/kg, above the SSL at a DAF of 1 of 0.26 mg/kg and the soil screening value for lower trophic level soil organisms of 0.52 mg/kg at seven locations.
  - Thallium was detected at concentrations of 0.18 mg/kg at 67SD05 and 0.3 mg/kg at 67SB02, above the adjusted residential RSL of 0.078 mg/kg and SSL at a DAF of 1 of 0.14 mg/kg. 67SD05 is located at the

most downgradient area of the drainage swale and may represent concentrations of constituents reflective of background conditions upgradient of the site.

- Vanadium was detected at concentrations ranging from 320 mg/kg to 371 mg/kg, above the adjusted residential RSL of 39 mg/kg, SSL at a DAF of 1 of 86 mg/kg, and the soil screening value for lower trophic level soil organisms of 130 mg/kg at two locations.

Subsurface Soil (Table 5-2 and Figures 5-4 through 5-5):

- VOCs (Figure 5-4): One VOC was detected in subsurface soil above screening values.
  - Tetrachloroethene was detected at a concentration of 2.4 µg/kg at 13E-SB03-05, slightly above the SSL at a DAF of 1 of 2.3 µg/kg. However, the soil sample from this location was collected during the ECP, the result was not validated, and the sample was collected from a depth greater than 6 ft bgs.
- SVOCs (Figure 5-4): Two SVOCs were detected in subsurface soil above screening values.
  - Dibenzo(a,h)anthracene was detected at a concentration of 110 µg/kg at 13E-SB01-04 and 63 µg/kg at 13E-SB02-05, above the residential RSL of 15 µg/kg and SSL at a DAF of 1 of 13 µg/kg. However, the soil samples from these two locations were collected during the ECP, the results were not validated, and the samples were collected from depths greater than 6 ft bgs. Dibenzo(a,h)anthracene was not detected above the residential RSL in all other subsurface soil samples collected at the SWMU.
  - Naphthalene was detected at a concentration of 1.4 µg/kg at 67SB01, above the SSL at a DAF of 1 of 0.54 µg/kg.
- Inorganics (Figure 5-5): Fifteen inorganics were detected in subsurface soil above NAPR background screening values. Thirteen of the fifteen inorganics also exceeded one or more other screening values. Although the inorganics exceeding the regulatory screening values were detected sporadically across the site, with cobalt being the most common, the maximum concentrations of inorganics exceeding these criteria generally were localized to a single subsurface soil sample collected from 5 to 7 ft bgs at 67SB01, which is just north of the concrete pad.
  - Barium was detected at a concentration of 652 mg/kg at 67SB01-03, above the SSL at a DAF of 1 of 82 mg/kg at two locations.
  - Beryllium was detected at a concentration of 4.9 mg/kg at 67SB01-03, above the SSL at a DAF of 1 of 3.2 mg/kg.
  - Chromium was detected at a concentration of 233 mg/kg at 67SB01-03, above the residential RSL for hexavalent chromium of 0.30 mg/kg, industrial RSL 6.3 mg/kg, and SSL at a DAF of 1 of 180,000mg/kg.
  - Cobalt was detected at concentrations ranging from 58.8 mg/kg to 472 mg/kg during the March 2010 subsurface soil sampling investigation, above the adjusted residential RSL of 2.3 mg/kg and the SSL at a DAF of 1 of 0.27 mg/kg at five locations, and above the industrial RSL of 35 mg/kg at seven of those locations. During the January and July 2014 subsurface soil sampling investigation, cobalt was detected at concentrations from 7.2 mg/kg to 36.5 mg/kg, above the adjusted residential RSL of 2.3 mg/kg and the SSL at a DAF of 1 of 0.27 mg/kg at the 6 additional locations, and above the industrial RSL of 35 mg/kg at two of those locations.
  - Copper was detected at concentrations of 493 mg/kg at 67SB07-05 and 681 mg/kg at 67SB01-03, above the adjusted residential RSL 310 mg/kg and SSL at a DAF of 1 of 46 mg/kg.
  - Lead was detected at a concentration of 27.4 mg/kg, above the SSL at a DAF of 1 of 14 mg/kg at 67SB08-01. However, the location (soil boring SB08) is west of Langley Drive and upgradient of SWMU 67, so the detected concentration is more representative of local background, as discussed in Step 3.

- Mercury was detected at concentrations ranging from 0.12 mg/kg to 0.22 mg/kg, above the SSL at a DAF of 1 of 0.1 mg/kg at three locations.
- Nickel was detected at a concentration of 310 mg/Kg, which is above background and exceeds the adjusted residential RSL and SSL at a DAF of 1 of 26 mg/kg at one location and at concentrations above only the SSL at one location. The concentration that exceeded the SSL is below the background value of 34.1 mg/kg.
- Thallium was detected at a concentration of 4.2 mg/kg at 67SB01-03, at a concentration of 0.31 mg/kg at 67SB01D, at and 0.58 mg/kg at 67SB02-01, above the adjusted residential RSL of 0.078 mg/kg and SSL at a DAF of 1 of 0.14 mg/kg.
- Vanadium was detected at concentrations of 821 mg/kg at 67SB07-05 and 1,480 mg/kg at 67SB01-03, above the adjusted residential and industrial RSLs of 39 mg/kg and 580 mg/kg, respectively, and SSL at a DAF of 1 of 86 mg/kg.
- Zinc was detected at a concentration of 541 mg/kg at 67SB01-03, above the SSL at a DAF of 1 of 370 mg/kg.

Groundwater (Table 5-3 and Figure 5-6):

- VOCs: No VOCs were detected in groundwater above the screening values.
- SVOCs: One SVOC was detected in groundwater above screening values.
  - Naphthalene was detected at a concentration of 1 microgram per liter (µg/L) at 67GW07, above the tap-water RSL of 0.17 µg/L.
- Inorganics: Two total and/or dissolved inorganics were detected in groundwater above background and one or more additional screening value.
  - Thallium (total and dissolved) was detected at concentrations ranging from 0.05 µg/L to 0.61 µg/L, above the adjusted tapwater RSL of 0.02 µg/L and the Puerto Rico Groundwater Quality Standard of 0.24 µg/L at five locations, and above just the adjusted tapwater RSL at two locations.
  - Vanadium (dissolved) was detected at concentration s ranging from 21.4 µg/L to 90.9 µg/L, above the adjusted tapwater RSL of 8.6 µg/L at four locations. However, only one of the detections, at 67GW03, exceeded the background value of 72.9 µg/L.

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

Human Health Evaluation

As a conservative approach, risk estimates were prepared for a future residential (i.e., unrestricted) scenario as well as the industrial scenario at SWMU 67. All validated soil (up to 6 ft bgs) and groundwater data collected as part of the Phase I RFI were included in this evaluation. Based on the more realistic depth of soil contact by human receptors, soil samples collected from depths of 0 to 6 ft bgs were used in the human health evaluation. As a conservative approach, soil sample depths that straddle this depth (e.g., collected from 5 to 7 ft bgs) were included in the evaluation.

The residential and industrial soil RSLs from January 2015 (USEPA, 2015), adjusted for a HQ of 0.1, were used to screen detected concentrations in surface soil and total soil (merged surface and subsurface soil). Detected concentrations in groundwater were compared to the tapwater RSLs (USEPA, 2015) and the Puerto Rico Groundwater Quality Standards for Class SG waters from 2014. The RSLs for non-carcinogenic effects were adjusted (lowered) by a factor of 0.1 to account for cumulative non-carcinogenic effects, with the exception of lead. Constituents exceeding the screening levels are presented in **Tables 5-4** and **5-5**.

ELCRs and non-cancer HQs were estimated for a residential scenario (**Table 5-4**), industrial scenario (**Table 5-5**), and groundwater potable use scenario (**Tables 5-4** and **5-5**). ELCRs and non-cancer HQs were calculated using the ratio of RSLs and EPC as follows:

- Non-cancer HQ = EPC / Non-cancer RSL (based on HQ of 1)
- ELCR = EPC x 10^{-6} / Cancer RSL (based on ELCR = 10^{-6})

The estimated ELCRs and HQs were compared to USEPA's acceptable risk range of 1 to 100 in a million (1 x 10^{-6} to 1 x 10^{-4}) and an acceptable HQ of 1, respectively. Generally, corrective actions are not warranted for site media with an ELCR of 1 x 10^{-4} or below, or a HQ of 1 or less. Inorganic constituent concentrations detected in soil and groundwater were also compared to the BTVs (CH2M HILL, 2013b), as presented in **Tables 5-4** and **5-5**. The results of the risk screening evaluation are discussed as follows for the residential and industrial exposure scenarios.

- Soil – Residential Evaluation

  Chromium (conservatively assumed to be hexavalent chromium [Cr^{6+}] in the screening step) and cobalt in soil were detected at concentrations above BTVs and RSLs (unadjusted for chromium and adjusted for cobalt) at concentrations exceeding 100 times the screening levels (**Table 5-4**). Due to the small site size (2.5 acres), the lack of preferential exposure areas onsite, the areal extent of exceedances at various locations across the site, and the low magnitude of background exceedance, no hot spots were identified and all soil data were merged in the residential evaluation.

  Seven inorganics (arsenic, chromium, cobalt, copper, nickel, thallium, and vanadium) and two PAHs were detected in surface soil (0 to 2 ft) or total soil (0 to 6 ft) above both human health screening levels for residential land use and BTVs (inorganics only; see **Table 5-4**). An iterative approach was used if the maximum detected concentration caused an exceedance of USEPA's acceptable risk levels; USEPA's ProUCL software was used to calculate the 95% UCL of the mean concentration if more than eight analytical results were available for the constituent.

  - Arsenic was detected in 11 of 15 surface soil samples and 19 of 26 total soil samples above its residential RSL (0.67 mg/kg). Based on the 95% UCL concentration (2.5 mg/kg) in surface soil, the ELCR is 4 x 10^{-6} and the non-cancer HQ is 0.07, which are within USEPA's acceptable levels, such that arsenic would not be identified as a risk driver. Further, as noted previously, arsenic concentrations at the site are likely attributable to background.

  - Chromium was detected in all 15 surface soil samples and all 26 total soil samples above its residential RSL (0.30 mg/kg based on Cr^{6+}). However, trivalent chromium (Cr^{3+}) is the expected form of chromium present at the site based on the NAPR's environmental and geological conditions, which are similar to those on Vieques. The chromium memorandum provided in **Appendix C**, which is applicable to NAPR, provides the rationale for why the prevalent form of chromium on Vieques is Cr^{3+}. Hazard estimates associated with the maximum detected concentration (233 mg/kg) of Cr^{3+} in 0 to 6 ft of soil are far below USEPA's target HI of 1 (non-cancer HQ is 0.002). Therefore, chromium would not be identified as a risk driver. In addition, with the exception of one subsurface soil sample, chromium concentrations are at or below its BTV.

  - Cobalt was detected in all 15 surface soil samples and all 33 total soil samples above its adjusted residential RSL (2.3 mg/kg). Based on the 95% UCL concentration (106 mg/kg) in total soil, the ELCR is 3 x 10^{-7} and the non-cancer HQ is 5, the latter of which exceeds USEPA's target HQ, such that cobalt would be identified as a risk driver. However, if the cobalt detected at SWMU 67 were associated with site-related activities, it is reasonable to assume that additional constituents associated with these activities would have been observed as further indicators of obvious releases, which is not the case (see Step 3 discussion).

  - Copper was not detected above the adjusted RSL in surface soil and was detected in only 1 of 26 total soil samples above its adjusted residential RSL (310 mg/kg). Based on the maximum detected concentration

(681 mg/kg), the non-cancer HQ is 0.2, which is within USEPA's acceptable level, such that copper would not be identified as a risk driver.

- Nickel was detected in no surface soil samples and 1 of 26 total soil samples above its adjusted residential RSL (150 mg/kg). Based on the maximum detected concentration (310 mg/kg), the ELCR is 2×10^{-8} and the non-cancer HQ is 0.2, which are within USEPA's acceptable levels, such that nickel would not be identified as a risk driver.
- Thallium was detected in 4 of 15 surface soil samples and 9 of 26 total soil samples above its adjusted residential RSL (0.078 mg/kg). Based on the 95% UCL concentration (1.3 mg/kg), the non-cancer HQ is 2, which exceeds USEPA's acceptable level, such that thallium would be identified as a risk driver. However, the thallium concentrations are above the BTVs (0.27 mg/kg for subsurface soil) in only one of the surface soil samples (0.3 mg/kg) and three of the subsurface soil samples (maximum concentration of 4.2 mg/kg). The remaining surface and subsurface soil background exceedances are located at 67SB01 and 67SB02, north and east of the concrete pad/pit area, respectively. There is no evidence that thallium would be associated with gas station/service center activities, as thallium is used mostly in manufacturing electronic devices, switches, and closures, primarily for the semiconductor industry. It also has limited use in the manufacture of special glass and for certain medical procedures. Thallium enters the environment primarily from coal-burning and smelting, in which it is a trace contaminant of the raw materials (ATSDR, 1992). Therefore, its presence at SWMU 67 is not likely due to a site-related release.
- Vanadium was detected in all 15 surface soil samples and all 26 total soil samples above its adjusted residential RSL (39 mg/kg). Based on the 95% UCL concentration (480 mg/kg) in total soil, the non-cancer HQ is 1, which does not exceed USEPA's acceptable level, such that vanadium would not be identified as a risk driver.
- Benzo(a)pyrene was detected in 1 of 15 surface soil and 1 of 26 total soil samples above its residential RSL (15 µg/kg). Based on the 95% UCL concentration (31 µg/kg), the ELCR is 2×10^{-6}, which is within USEPA's acceptable range, such that benzo(a)pyrene would not be identified as a risk driver.
- Dibenz(a,h)anthracene was detected in 1 of 15 surface soil and 1 of 26 total soil samples above its residential RSL (15 µg/kg). Based on the 95% UCL concentration (4.5 µg/kg), the ELCR is 3×10^{-7}, which is within USEPA's acceptable range, such that dibenz(a,h)anthracene would not be identified as a risk driver.

Based on maximum detected concentrations of chromium, copper, and nickel, and 95% UCLs of arsenic, cobalt, thallium, vanadium, benzo(a)pyrene, and dibenz(a,h)anthracene, the cumulative ELCR is 6×10^{-6} and the maximum target organ-specific HI is 5 (**Table 5-4**); the cumulative ELCR is within USEPA's acceptable range, while the target organ-specific HI is above USEPA's acceptable level. Consequently, there is a concern for potential effects from cobalt and thallium in soil at SWMU 67 for a residential land use scenario. As previously noted, thallium is not likely associated with gas station/service center activities and there is not strong evidence that cobalt concentrations are due to a site-related release.

- The predominant inorganic risk driver (cobalt) is present in the deeper subsurface soil (5 to 7 ft bgs) sample SB01, adjacent to the former concrete pad and pit; at this depth, the likely impact to human receptor exposure is minimal and concentrations do not appear to be migrating to groundwater at levels that would result in an unacceptable risk as a result of a site release. In addition, the presence of cobalt, which may be associated with maintenance shop and gas station use, would likely accompany VOCs and/or SVOCs if it were attributable to a site-related release, which is not the case.
- In other areas of the site, cobalt, which was identified as a risk driver and may have some association with gas station/service center activities, is comparable to the BTV, concentrations in other areas upgradient of the concrete building and gas station area where service center uses were most likely to occur, and/or concentrations west of Langley drive. Releases associated with former gas station/service center uses are not likely in these areas.

- Soil – Industrial Evaluation

  No chemicals in soil were detected above background and adjusted RSLs at concentrations exceeding 100 times the screening levels (**Table 5-5**). Therefore, no hot spots were identified and all soil data were merged in the industrial scenario evaluation.

  Five inorganics (arsenic, chromium, cobalt, thallium, and vanadium) were detected in surface soil (0 to 2 ft) or total soil (0 to 6 ft) above both human health screening levels for industrial land use and BTVs (**Table 5-5**). An iterative approach was used if the maximum detected concentration caused an exceedance of USEPA's acceptable risk levels; USEPA's ProUCL software was used to calculate the 95% UCL on the mean concentration if more than eight analytical results were available for the chemical.

  - Arsenic was detected in 1 of 15 surface soil samples and 1 of 26 total soil samples above its industrial RSL (3.0 mg/kg). Based on the 95% UCL concentration (2.5 mg/kg) in surface soil, the ELCR is 8×10^{-7} and the non-cancer HQ is 0.005, which are less than USEPA's acceptable levels, such that arsenic would not be identified as a risk driver. Further, as previously noted, arsenic concentrations at the site are likely attributable to background.
  - Chromium was detected in all 15 surface soil samples and all 26 total soil samples above its industrial RSL (6.3 mg/kg based on Cr^{6+}). Based on the maximum detected concentration (233 mg/kg) and the expected form of chromium (Cr^{3+}) at the site, the non-cancer HQ is 0.0001, which is within USEPA's acceptable level, such that chromium would not be identified as a risk driver. In addition, as previously noted, with the exception of one subsurface soil sample, chromium concentrations are below its BTV.
  - Cobalt was detected in 4 of 15 surface soil samples and 11 of 33 total soil samples above its adjusted industrial RSL (35 mg/kg). Based on the 95% UCL concentration (106 mg/kg) in total soil, the ELCR is 6×10^{-8} and the non-cancer HQ is 0.3, which are less than USEPA's acceptable levels, such that cobalt would not be identified as a risk driver.
  - Thallium was detected in no surface soil samples and 1 of 26 total soil samples above its adjusted industrial RSL (1.2 mg/kg). Based on the maximum detected concentration (4.2 mg/kg) in total soil, the non-cancer HQ is 0.4, which is less than USEPA's acceptable level, such that thallium would not be identified as a risk driver.
  - Vanadium was detected in no surface soil samples and 1 of 26 total soil samples above its adjusted industrial RSL (580 mg/kg). Based on the maximum detected concentration (1,480 mg/kg) in total soil, the non-cancer HQ is 0.3, which is less than USEPA's acceptable level, such that vanadium would not be identified as a risk driver.
  - Based on maximum detected concentrations of chromium, thallium, and vanadium, and 95% UCL concentrations of arsenic and cobalt, the cumulative ELCR is 9.1×10^{-7} and the maximum target organ-specific HI is 0.6 (see **Table 5-5**), which are less than USEPA's acceptable levels. Consequently, there is not a concern for potential cumulative effects from constituents in soil at SWMU 67 for an industrial land use scenario.

- Groundwater

  Naphthalene was the only organic constituent detected in groundwater above the human health screening level (**Tables 5-4** and **5-5**).

  - Naphthalene was detected in one sample, at a concentration of 1 µg/L. The estimated ELCR is 6×10^{-6} and the non-cancer HQ is 0.2, which are within USEPA's acceptable levels, such that naphthalene would not be identified as a risk driver.

  Eight inorganics (antimony, arsenic, chromium, cobalt, nickel, selenium, thallium, and vanadium) were detected in groundwater above human health screening levels. Based on maximum detected concentrations of naphthalene, and the 8 inorganics (the higher of the "total" and "dissolved" results was used for each

inorganic), the cumulative ELCR is 2 x 10^{-4} and the maximum target organ-specific HI is 6 (**Tables 5-4** and **5-5**), which exceed USEPA's acceptable levels. Consequently, there is a concern for potential cumulative effects from multiple inorganics in groundwater at SWMU 67 if the groundwater is used as a potable source. However, none of the detected concentrations exceeded MCLs and, with the exception of thallium, which was not detected in background samples, all of the inorganics are attributable to background (i.e., less than BTVs, with the exception of one detected concentration of dissolved vanadium). Therefore, the potable use concern is not site-related.

- Cumulative Soil and Groundwater

  Potential cumulative risks from residential and industrial exposure to soil and potable use of groundwater were evaluated. As indicated in **Tables 5-4** and **5-5**, the cumulative ELCR is 2 x 10^{-4} for both residential and industrial land use. The maximum target organ-specific HI is 11 for residential use as a result of cobalt, in soil and groundwater. The maximum target organ-specific HI for industrial use is 6 due to the presence of cobalt in groundwater (potable use). Therefore, there is a concern for cumulative effects from soil and potable groundwater use under a hypothetical residential scenario. However, as previously discussed, concentrations of thallium in soil are not likely site-related and the highest concentrations of cobalt in soil predominately occur in the deeper soil at 67-SB01. In addition, it is reasonable to expect that other contaminants, such as VOCs and SVOCs and other metals, would be present with cobalt if it were site-related from a release associated with a gas station/service center. Soil exposures associated with industrial use of the property are within USEPA's acceptable levels and the risks associated with potable use of groundwater are not attributable to a site release.

Ecological Evaluation

The primary complete ecological exposure pathways at SWMU 67 are to surface soil on the site and in the drainage swale. Thus, only soil data within the 0- to 1-ft interval from the site and swale were screened for direct exposures (of all detected constituents) to soil organisms (plants and soil invertebrates). The hydrology of the drainage swale is irregular and the presence of standing or flowing water is highly transitory. Thus, the drainage swale samples are more similar to soil than to sediment, even though most of this area is within the wetland boundary, and these samples are appropriately treated as soil, not sediment (see Section 3.2). Also, the one surface water sample collected near the culvert was not screened since this area is too small (about 8 ft long by 4 ft wide) and the water too transitory to provide significant suitable habitat for aquatic receptors. However, the water in this pool was incorporated into the food web models as a possible drinking water source.

Based on site size and habitat characteristics, exposure of bioaccumulative constituents in surface soil to upper trophic level receptors (birds and mammals) was also considered. Evaluation of the surface soil samples (0 to 1 ft from the site and 0 to 6 inches from the swale) was conducted in two steps. In the first step, maximum surface soil concentrations were compared to bird and mammal Eco-SSLs. Constituents that exceeded either the bird or mammal Eco-SSL (or if the bioaccumulative constituent did not have either a bird or mammal Eco-SSL) were modeled for site-specific food web exposures to the Norway rat, Indian mongoose, pearly-eyed thrasher, common ground dove, and red-tailed hawk, in accordance with the ERA Protocol jointly developed by USEPA, PREQB, and the Navy for the Vieques facility (CH2M HILL, 2010a, as updated in August 2010 [CH2M HILL, 2010b]). Food web model calculations and the resulting HQs based on 95% UCL and mean surface soil concentrations are presented as follows.

- No VOCs or SVOCs were detected in site surface soil samples above soil screening values for lower trophic level soil organisms (plants and soil invertebrates).
- Copper, lead, mercury, selenium, and vanadium exceeded both soil screening values for lower trophic level soil organisms (plants and soil invertebrates) and BTVs in surface soil (**Tables 5-6** and **5-7**). None of these constituents poses an unacceptable risk to plants and soil invertebrates based on the following:
  - Copper exceeded both the ecological screening value for soil organisms (maximum HQ of 3.96) and the background UTL in just 1 of 15 surface soil samples, at a maximum ratio to the background UTL of 1.44

(**Table 5-6**). This information suggests that exposures to copper in surface soil on the site are not ecologically significant relative to background.

- Lead exceeded the ecological screening value for soil organisms (maximum HQ of 1.12) in 1 of 15 surface soil samples, although the field duplicate of the exceeding sample was less than the screening value (**Table 5-6**). The 95% UTL and mean lead concentration were less than the ecological screening value for soil organisms. This information suggests that exposures to lead in surface soil are not ecologically significant.
- Mercury exceeded both the ecological screening value for soil organisms (maximum HQ of 1.70) and the background UTL (maximum ratio of 1.30) in just 1 of 15 surface soil samples (**Table 5-6**). However, the one exceedance was in the duplicate of sample 67SB08-00 (the parent sample did not exceed), which is located offsite on the other side of Langley Drive in a maintained grass area. In addition, the 95% UTL and mean mercury concentrations were less than the ecological screening value for soil organisms and the background value. This information suggests that exposures to mercury in surface soil on the site are not ecologically significant.
- Selenium exceeded both the ecological screening value for soil organisms (maximum HQ of 4.23) and the background UTL (maximum ratio of 2.06) in 9 of 15 surface soil samples (**Table 5-6**). The soil screening value, however, is based on potential impacts to plants. As noted previously, the non-developed portion of the site is heavily vegetated and there is no sign of stress to plants. The maximum surface soil concentration is less than soil screening values based on other receptors (e.g., 4.10 mg/kg for soil invertebrates). In addition, the maximum surface soil concentration was in sample 67SB08-00, which is located offsite on the other side of Langley Drive in a maintained grass area. All other screening value exceedances (range of 1.5 to 1.6 mg/kg) were only slightly higher than the maximum background (1.20 mg/kg). This information suggests that exposures to selenium in surface soil on the site are not ecologically significant.
- Vanadium exceeded both the ecological screening value for soil organisms (maximum HQ of 2.85) and the background UTL in 2 of 15 surface soil samples (**Table 5-6**). The maximum ratio to the background UTL was only 1.30. However, the one exceedance outside of the drainage swale was in sample 67SB08-00, which is located offsite on the other side of Langley Drive in a maintained grass area. There was one exceedance of soil screening values and background UTLs in the drainage swale. However, this exceedance was of low magnitude relative to background and the swale is not directly connected to the site hydrologically, suggesting that it is not site-related. This information suggests that exposures to vanadium in surface soil on the site are not ecologically significant relative to background and not the result of a site-related release.

Antimony, cadmium, chromium, copper, lead, selenium, vanadium, and zinc exceeded soil screening values (Eco-SSLs) protective of upper trophic level organisms (**Table 5-7**) and were retained for site-specific food web modeling using the five bird and mammal receptors listed at the beginning of this section and 95% UCL and mean surface soil concentrations. Calculations and HQs are shown in **Tables 5-8** through **5-17**. Based on a comparison to No Observed Adverse Effect Levels (NOAELs), both the 95% UCL and mean exposures doses for vanadium resulted in a HQ above 1 for the common ground dove and pearly-eyed thrasher. Both the 95% UCL and mean exposure doses for vanadium also resulted in exceedances of the Maximum Acceptable Toxicant Concentration (MATC) (and Lowest Observed Adverse Effect Level [LOAEL]) for the dove and thrasher, suggesting unacceptable risk to these two upper trophic level receptors based upon the decision rule in the Vieques ERA protocol (unacceptable risk if the mean exposure dose HQ based on the MATC is greater than 1). However, as previously discussed, vanadium exceeded background in just 2 of 15 surface soil samples and none on the site proper (the exceedances were in samples across Langley Drive and in the offsite drainage swale). The maximum ratio to the background UTL was only 1.20. This information suggests that exposures for upper trophic level receptors to vanadium in surface soil on the site are not ecologically significant relative to background.

Soil to Groundwater Pathway Evaluation

An evaluation of soil data was completed to compare soil to groundwater SSLs at a 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).

- Organics: No VOCs exceeded the SSLs at a DAF of 1. In soil, benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h) anthracene, and naphthalene are present at concentrations above the SSLs at a DAF of 1. However, the exceedances are limited to three locations, two of which are located in drainage swales. Although these PAHs are present above the SSL at a DAF of 1 in soil, only naphthalene is present above the tap-water RSLs in groundwater, at one location, which is upgradient of the soil exceedances. This suggests the SSL at a DAF of 1 overestimates the leaching potential, which has been demonstrated at other sites in Puerto Rico. Additionally, the sporadic and relatively low concentrations of these constituents are likely the result of normal, anthropogenic use of the facility and not a site-related RCRA release.
- Inorganics: Fourteen inorganics are present in soil above the SSL at a DAF of 1. Eleven of these constituents also exceed the BTVs in various locations. However, concentrations of these constituents in groundwater do not exceed the MCLs and although some constituents exceed the tap-water RSLs, concentrations are less than the BTVs for all constituents except thallium. Please see the Step 3 and Step 5 Human Health Risk Assessment (HHRA) discussion regarding thallium, which indicates its presence is not likely attributable to a site-related release. Therefore, leaching of inorganic contamination in soil (if present) to groundwater as a result of site releases is not a concern. Further, the SSL at a DAF of 1 generally overestimates the leaching potential, which has been demonstrated at other sites in Puerto Rico.

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

Historical information indicates the most likely source of site-related contamination regulated under RCRA would be from the former pit in the concrete pad and possible former use of the site as a gas station and service area. Samples were biased to these areas and in the drainage swales conveying runoff from this area and in direct discharge from the swale. In addition, if there had been a release as a result of historical activities that was not identified by the soil sampling effort, the spatial distribution of monitoring wells is sufficient to have captured evidence of historical releases. In fact, groundwater data are consistent with the soil data by indicating that a site-related release warranting further investigation or action did not occur. In addition, the results of sample data adjacent to the tennis courts (especially the immediately downgradient groundwater) and historical photographic reviews (i.e., a cleared area likely used for parking) indicate the absence of data directly beneath the tennis courts is not a data gap warranting further investigation. In addition, the geophysical investigation, conducted in February 2014, confirmed that there is no evidence of a UST on the site and results from the subsurface soil samples collected in 2014 determined that the single elevated cobalt concentration found previously (Baker, 2011) is isolated and there is no indication of a widespread release warranting additional investigation or action.

TABLE 5-1
Surface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background SS	Industrial Soil Adjusted RSLs[1] (Jan 2015)	Residential Soil Adjusted RSLs[1] (Jan 2015)	SSLs[2] (DAF 1) (Jan 2015)	CLEAN Vieques ESVs Soil	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07
Sample ID						67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00
Sample Date						03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10
Chemical Name												
Volatile Organic Compounds (µg/kg)												
2-Butanone	--	19,000,000	2,700,000	1,200	--	19	19 U	12	5.6 J	13 U	11 U	20 J
Acetone	--	67,000,000	6,100,000	2,900	--	240	220	140	63	79	110	280 J
Benzene	--	5,100	1,200	2.6	6.8	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	0.59 J
Carbon disulfide	--	350,000	77,000	240	--	3.8 U	4.2 U	3.5 U	0.92 J	5.1 U	4.2 U	6.4 UJ
Chloroform	--	1,400	320	22	1,844	3.8 U	4.2 U	0.24 J	0.3 J	5.1 U	4.2 U	6.4 UJ
Chloromethane	--	46,000	11,000	49	5,000	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	0.42 J	6.4 UJ
Iodomethane	--	--	--	--	--	1.9 J	0.7 J	1.1 J	4.4 U	5.1 U	1.6 J	6.4 UJ
m- and p-Xylene	--	240,000	55,000	190	2,400	7.6 U	0.12 J	7 U	8.8 U	10 U	8.5 U	13 UJ
Methylene chloride	--	320,000	35,000	1.3	1,250	3.8 U	4.2 U	0.35 J	4.4 U	5.1 U	4.2 U	6.4 UJ
Xylene, total	--	250,000	58,000	9,800	2,400	3.8 U	0.12 J	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ
Semivolatile Organic Compounds (µg/kg)												
2-Methylnaphthalene	--	300,000	23,000	190	--	9.4 U	0.81 J	8.9 U	8.8 U	9.5 U	9.5 U	10 UJ
Acenaphthene	--	4,500,000	350,000	5,500	--	9.4 U	9.8 U	8.9 U	8.8 U	9.5 U	9.5 U	10 U
Acenaphthylene	--	4,500,000	350,000	5,500	--	9.4 U	1.2 J	8.9 U	1.4 J	9.5 U	9.5 U	10 U
Anthracene	--	23,000,000	1,700,000	58,000	--	0.5 J	0.69 J	0.72 J	1.4 J	9.5 U	9.5 U	10 U
Benzo(a)anthracene	--	2,900	150	12	--	1.2 J	2.7 J	3.8 J	4.7 J	9.5 U	1 J	10 U
Benzo(a)pyrene	--	290	15	240	--	1.6 J	9.8 U	4.8 J	6.9 J	0.6 J	1.6 J	10 U
Benzo(b)fluoranthene	--	2,900	150	41	--	1.4 J	4.1 J	5.1 J	5.2 J	9.5 UJ	2.5 J	10 UJ
Benzo(g,h,i)perylene	--	--	--	--	--	1.7 J	3.4 J	3.7 J	4.9 J	0.47 J	1.6 J	10 U
Benzo(k)fluoranthene	--	29,000	1,500	400	--	1.9 J	3.1 J	8.9 U	8.8 U	0.55 J	1.6 J	10 U
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	30,000	190 U	200 U	360 U	39 J	200 U	200 U	210 U
Chrysene	--	290,000	15,000	1,200	--	1.5 J	3.5 J	3.1 J	6.8 J	9.5 U	0.96 J	10 U
Dibenz(a,h)anthracene	--	290	15	13	--	0.5 J	9.8 UJ	0.81 J	1.2 J	9.5 U	9.5 UJ	10 U
Di-n-butylphthalate	--	8,200,000	620,000	2,300	40,000	190 U	200 U	360 U	180 U	200 U	200 U	23 J
Fluoranthene	--	3,000,000	230,000	89,000	--	9.4 U	5.9 J	5.9 J	17	9.5 U	9.5 U	10 U
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	--	2 J	4.5 J	3.6 J	6.9 J	0.62 J	1.9 J	10 UJ
Phenanthrene	--	--	--	--	--	9.4 U	2.8 J	2.7 J	6.1 J	9.5 U	1.6 J	10 U
Pyrene	--	2,300,000	170,000	13,000	--	1 J	4.7 J	6 J	13	9.5 U	1.2 J	10 U
Herbicides (µg/kg)												
No Detections												
Explosives (µg/kg)												
No Detections												

TABLE 5-1

Surface Soil Detections and Exceedances of Screening Criteria

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SS**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	**CLEAN Vieques ESVs Soil**	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07
Sample ID						67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00
Sample Date						03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10
Chemical Name												
Total Metals (mg/kg)												
Antimony	2.7	47	3.1	0.27	78	1.1 UJ	0.52 J	0.14 J	0.26 J	1.1 UJ	1.2 UJ	1.2 UJ
Arsenic	2.75	3	0.67	0.29	18	0.23 J	**1**	0.52 U	**0.99**	0.49 J	0.57 U	**0.73**
Barium	322	22,000	1,500	82	330	127	130	203	94.7	56.2	31.8	59.1
Beryllium	0.676	230	16	3.2	40	0.29 J	0.35 J	0.4 J	0.25 J	0.19 J	0.14 J	0.19 J
Cadmium	0.765	98	7	0.38	32	0.26 J	0.36 J	0.17 J	0.24 J	0.18 J	0.13 J	0.18 J
Chromium	55	6.3	0.3	100,000	64	**41.8**	**41.3 J**	**47.4 J**	**33.6 J**	**13**	**16.4 J**	**24.1**
Cobalt	52.3	35	2.3	0.27	13	**23.2 J**	**38.1 J**	**24.7**	**26.5**	**21 J**	**15.6 J**	**24.4 J**
Copper	192	4,700	310	46	70	115 J	277 J	50.7	99.2	80.1 J	55.7 J	78.4 J
Lead	34.2	800	400	14	120	13.4 J	62.4	4.3	9.3	2.2 J	2.1	3.7 J
Mercury	0.131	35	2.3	0.1	0.1	0.041	0.066	0.037	0.037	0.011	0.038 U	0.011
Nickel	28	2,200	150	26	38	13.6	16.3 J	11.5	15.2	6.7	12 J	9.8
Selenium	1.07	580	39	0.26	0.52	1.2 J	1.5 J	0.58 J	0.42 J	0.43 J	0.34 J	0.49 J
Silver	--	580	39	0.8	560	0.57 U	0.082 J	0.52 U	0.057 J	0.56 U	0.57 U	0.59 U
Thallium	--	1.2	0.078	0.14	1	**0.085 J**	**0.3 J**	0.037 J	0.047 J	0.022 J	0.57 U	0.04 J
Vanadium	286	580	39	86	130	**147 J**	**213 J**	**150**	**170**	**177 J**	**88.5 J**	**151 J**
Zinc	132	35,000	2,300	370	120	46.3	85.7 J	32.8 J	67.1 J	61.2	36.8 J	61.3
Wet Chemistry												
Total organic carbon (TOC) (mg/kg)	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons ()												
TPH-diesel range (UG/KG)	--	--	--	--	--	11,000 U	12,000	11,000 U	11,000 U	110,000	11,000 U	12,000 U

Notes:

Bold box indicates exceedance of NAPR Background SS.

Underline indicates exceedance of RSLs Industrial Soil Adjusted.

Bold text indicates exceedance of RSLs Residential Soil Adjusted.

Grey shading indicates exceedance of SSLs at a DAF of 1

Red text indicates exceedance of Vieques ESVs Soil.

[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

[2] SSLs are Risk-Based if there is no MCL-Based value.

NA - Not analyzed

DAF - dilution attenuation factor

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

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SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background SS	Industrial Soil Adjusted RSLs[1] (Jan 2015)	Residential Soil Adjusted RSLs[1] (Jan 2015)	SSLs[2] (DAF 1) (Jan 2015)	CLEAN Vieques ESVs Soil	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID						67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date						03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name															
Volatile Organic Compounds (µg/kg)															
2-Butanone	--	19,000,000	2,700,000	1,200	--	6.8 J	13	11 J	20	9.4 J	13 J	15 J	15 J	14 U	14 U
Acetone	--	67,000,000	6,100,000	2,900	--	110	170	95	170	120 J	200 J	190	210 J	14 R	14 R
Benzene	--	5,100	1,200	2.6	6.8	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Carbon disulfide	--	350,000	77,000	240	--	5.2 U	4.6 U	5.1 J	36 J	0.86 J	2.7 J	15	1.7 J	5.5 U	5.7 U
Chloroform	--	1,400	320	22	1,844	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Chloromethane	--	46,000	11,000	49	5,000	5.2 U	4.6 U	6.6 U	6 U	0.76 J	6.8 UJ	8.2 U	0.82 J	5.5 UJ	5.7 UJ
Iodomethane	--	--	--	--	--	1.8 J	2.9 J	1.2 J	0.77 J	2.5 J	2.9 J	2.3 J	2.5 J	5.5 U	5.7 U
m- and p-Xylene	--	240,000	55,000	190	2,400	10 U	9.2 U	13 U	0.24 J	0.42 J	0.34 J	0.38 J	17 UJ	11 U	11 U
Methylene chloride	--	320,000	35,000	1.3	1,250	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Xylene, total	--	250,000	58,000	9,800	2,400	5.2 U	4.6 U	6.6 U	0.23 J	0.42 J	0.33 J	0.38 J	8.3 UJ	5.5 U	5.7 U
Semivolatile Organic Compounds (µg/kg)															
2-Methylnaphthalene	--	300,000	23,000	190	--	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	18 U	9.5 U	9.5 U
Acenaphthene	--	4,500,000	350,000	5,500	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	1.1 J	0.75 J
Acenaphthylene	--	4,500,000	350,000	5,500	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	3.6 J	1.9 J
Anthracene	--	23,000,000	1,700,000	58,000	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	2.5 J	1.5 J
Benzo(a)anthracene	--	2,900	150	12	--	11 U	11 U	13 UJ	28 J	14 U	13 U	14 U	52	11	8.6 J
Benzo(a)pyrene	--	290	15	240	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	**70**	11	10
Benzo(b)fluoranthene	--	2,900	150	41	--	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	110	6.7 J	6.5 J
Benzo(g,h,i)perylene	--	--	--	--	--	11 U	11 U	13 U	12 U	14 U	23	14 U	73	9.2 J	8.8 J
Benzo(k)fluoranthene	--	29,000	1,500	400	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	74	8 J	6.6 J
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	30,000	220 U	220 U	350 U	440 U	280 U	270 U	290 U	360 UJ	100 J	64 J
Chrysene	--	290,000	15,000	1,200	--	11 U	11 U	13 UJ	24 J	14 U	13 U	14 U	77	10	7.4 J
Dibenz(a,h)anthracene	--	290	15	13	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	**28**	2 J	1.6 J
Di-n-butylphthalate	--	8,200,000	620,000	2,300	40,000	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Fluoranthene	--	3,000,000	230,000	89,000	--	11 U	11 U	13 UJ	43 J	14 U	13 U	14 U	95	17	15
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	--	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	100	8.8 J	9.6
Phenanthrene	--	--	--	--	--	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	8.2 J	6 J
Pyrene	--	2,300,000	170,000	13,000	--	11 U	11 U	13 UJ	51 J	14 U	13 U	14 U	90	16	16
Herbicides (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															

TABLE 5-1

Surface Soil Detections and Exceedances of Screening Criteria

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SS**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	**CLEAN Vieques ESVs Soil**	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID						67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date						03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name															
Total Metals (mg/kg)															
Antimony	2.7	47	3.1	0.27	78	1.2 UJ	1.3 UJ	1.2 J	1.4 UJ	1.5 UJ	1.5 UJ	1.7 UJ	2 UJ	0.21 J	0.17 J
Arsenic	2.75	3	0.67	0.29	18	**1.4**	**1.4**	**1.2**	**0.99**	**0.93**	**0.89**	**1.6**	**1.3**	**2.9**	**5**
Barium	322	22,000	1,500	82	330	48.1 J	23.9 J	62	53.3	44.8	68.3	61.8	113	116	108
Beryllium	0.676	230	16	3.2	40	0.38 J	0.2 J	0.27 J	0.24 J	0.28 J	0.25 J	0.31 J	0.31 J	0.34 J	0.3 J
Cadmium	0.765	98	7	0.38	32	0.14 J	0.16 J	0.79	0.7	0.51 J	0.32 J	0.35 J	0.79 J	0.35 J	0.35 J
Chromium	55	6.3	0.3	100,000	64	**25.2**	**32.8**	**28.2**	**21**	**27.5**	**23.8**	**36**	**37.2**	**28 J**	**47.9 J**
Cobalt	52.3	35	2.3	0.27	13	**10.6 J**	**10 J**	**44.5 J**	**35.9 J**	**45.6 J**	**32.8 J**	**41.8 J**	**25.7 J**	**28.9**	**25.7**
Copper	192	4,700	310	46	70	44.4 J	37.6 J	77.1 J	58.3 J	63.4 J	64 J	65.4 J	133 J	102	150
Lead	34.2	800	400	14	120	4.2 J	8.7 J	134 J	119 J	35.6 J	11 J	21.2 J	31.3 J	23.8	31.5
Mercury	0.131	35	2.3	0.1	0.1	0.015	0.17	0.028 J	0.04	0.033	0.023	0.041	0.084	0.081	0.054
Nickel	28	2,200	150	26	38	7.4 J	4.1 J	12.8	10.1	11.7	9.8	12.3	12.3	11.2	16.6
Selenium	1.07	580	39	0.26	0.52	1.6 J	2.2 J	1.4 J	1.2 J	1.4 J	1.5 J	1.5 J	1.6 J	1.3 J	1 J
Silver	--	580	39	0.8	560	0.61 U	0.63 U	0.15 J	0.69 U	0.77 U	0.76 U	0.85 U	0.99 U	0.077 J	0.049 J
Thallium	--	1.2	0.078	0.14	1	0.61 U	0.024 J	0.069 J	0.048 J	0.048 J	0.047 J	0.051 J	**0.18 J**	0.075 J	0.051 J
Vanadium	286	580	39	86	130	**320 J**	**272 J**	**232 J**	**190 J**	**371 J**	**170 J**	**282 J**	**214 J**	**227**	**149**
Zinc	132	35,000	2,300	370	120	25.5	33.3	86.8	75	68.7	81.4	65.1	98.1	71.5 J	63.8 J
Wet Chemistry															
Total organic carbon (TOC) (mg/kg)	--	--	--	--	--	NA	NA	NA	NA	25,440	14,030	25,600	47,770	NA	NA
Total Petroleum Hydrocarbons ()															
TPH-diesel range (UG/KG)	--	--	--	--	--	23,000	17,000	31,000 J	20,000 J	27,000 J	28,000 J	34,000 J	41,000 J	11,000 U	11,000 U

Notes:

Bold box indicates exceedance of NAPR Background SS.

Underline indicates exceedance of RSLs Industrial Soil Adjusted.

Bold text indicates exceedance of RSLs Residential Soil Adjusted.

Grey shading indicates exceedance of SSLs at a DAF of 1

Red text indicates exceedance of Vieques ESVs Soil.

[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

[2] SSLs are Risk-Based if there is no MCL-Based value.

NA - Not analyzed

DAF - dilution attenuation factor

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background SB Clay	Industrial Soil Adjusted RSLs[1] (Jan 2015)	Residential Soil Adjusted RSLs[1] (Jan 2015)	SSLs[2] (DAF 1) (Jan 2015)	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03	
Sample ID					13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04
Sample Date					05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10
Chemical Name														
Volatile Organic Compounds (µg/kg)														
2-Butanone	--	19,000,000	2,700,000	1,200	31 U	6.8 J	11 J	11 U	9.6 U	13 U	11 U	17 U	11 U	8 J
2-Hexanone	--	130,000	20,000	8.8	31 U	30 U	32 U	11 U	9.6 U	13 U	11 U	1.5 J	11 U	11 U
Acetone	--	67,000,000	6,100,000	2,900	62 U	44 J	43 J	130	120	61	54	150	23 J	120 J
Benzene	--	5,100	1,200	2.6	6.2 U	5.9 U	6.5 U	4.5 U	0.3 J	5.3 U	4.3 U	0.44 J	0.4 J	4.5 U
Carbon disulfide	--	350,000	77,000	240	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	4.9 J	4.3 U	0.72 J	4.4 U	0.95 J
Chlorobenzene	--	130,000	28,000	68	6.2 U	5.9 U	2.9 J	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U
Chloromethane	--	46,000	11,000	49	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	0.92 J	0.3 J	4.2 U	4.4 UJ	0.44 J
Iodomethane	--	--	--	--	6.2 U	5.9 U	6.5 U	1.9 J	1 J	5.3 U	0.78 J	4.1 J	4.4 U	1.6 J
m- and p-Xylene	--	240,000	55,000	190	NA	NA	NA	9 U	7.6 U	11 U	8.5 U	8.5 U	8.8 U	9.1 U
Tetrachloroethene	--	39,000	8,100	2.3	6.2 U	5.9 U	2.4 J	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U
Xylene, total	--	250,000	58,000	9,800	12 U	12 U	13 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U
Semivolatile Organic Compounds (µg/kg)														
2-Methylnaphthalene	--	300,000	23,000	190	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	10 U
Acenaphthylene	--	4,500,000	350,000	5,500	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	0.67 J	8.9 U	10 U
Anthracene	--	23,000,000	1,700,000	58,000	420 U	410 U	480 U	9 U	0.63 J	10 U	10 U	9.3 U	8.9 U	10 U
Benzo(a)anthracene	--	2,900	150	12	420 U	410 U	480 U	9 U	1.5 J	10 U	10 UJ	9.3 UJ	0.9 J	0.78 J
Benzo(a)pyrene	--	290	15	240	420 U	410 U	480 U	0.45 J	1.6 J	10 U	10 U	9.3 U	0.66 J	10 U
Benzo(b)fluoranthene	--	2,900	150	41	420 U	410 U	480 U	9 UJ	1.1 J	10 UJ	10 UJ	9.3 UJ	1 NJ	0.84 NJ
Benzo(g,h,i)perylene	--	--	--	--	120 J	75 J	480 U	9 U	1.5 J	0.56 J	10 UJ	9.3 UJ	8.9 U	10 U
Benzo(k)fluoranthene	--	29,000	1,500	400	420 U	410 U	480 U	0.48 J	1.5 J	10 U	10 UJ	9.3 UJ	0.95 NJ	0.79 NJ
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	420 U	410 U	480 U	180 U	61 J	210 U	200 U	190 U	46 J	210 U
Chrysene	--	290,000	15,000	1,200	420 U	410 U	480 U	9 U	1.3 J	10 U	10 U	9.3 U	0.8 J	10 U
Dibenz(a,h)anthracene	--	290	15	13	110 J	63 J	480 U	9 U	8.8 UJ	10 U	10 UJ	9.3 UJ	8.9 U	10 U
Di-n-butylphthalate	--	8,200,000	620,000	2,300	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U
Fluoranthene	--	3,000,000	230,000	89,000	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	10 U
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	110 J	60 J	480 U	0.49 J	1.8 J	0.67 J	10 UJ	9.3 UJ	8.9 U	0.55 J
Naphthalene	--	17,000	3,800	0.54	420 U	410 U	480 U	9 U	8.8 U	1.4 J	10 U	9.3 U	8.9 U	10 U
Phenanthrene	--	--	--	--	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	2.2 J
Pyrene	--	2,300,000	170,000	13,000	420 U	410 U	480 U	9 U	1.1 J	0.74 J	0.68 J	9.3 U	0.99 J	1.5 J
Herbicides (µg/kg)														
No Detections														
Explosives (µg/kg)														
No Detections														
Total Metals (mg/kg)														
Antimony	--	47	3.1	0.27	2.4 U	2.2 U	2.7 U	1.1 UJ	1.1 UJ	6.2 UJ	1.2 UJ	1.1 UJ	0.14 J	6.1 UJ
Arsenic	3.15	3	0.67	0.29	1.2 U	0.85 B	1.3 U	0.66	0.63	3.1 U	0.6 U	1.2	0.37 J	3.1 U
Barium	347	22,000	1,500	82	250	190	140	114	153	652	251	282	58.8	18.3 J
Beryllium	0.672	230	16	3.2	0.21 B	0.32 B	0.33 B	0.32 J	0.35 J	4.9	0.78	0.55 J	0.19 J	0.32 J
Cadmium	0.603	98	7	0.38	3 U	0.56 U	0.67 U	0.22 J	0.2 J	0.85 J	0.2 J	0.45 J	0.21 J	3.1 U
Chromium	167	6.3	0.3	100,000	**10**	**9**	**40**	**34.7**	**37.6**	**233**	**57.6 J**	**48.8 J**	**6.7 J**	**11.5 J**
Cobalt	49.8	35	2.3	0.27	10	23	**36**	27.4 J	30.7 J	**472 J**	28.8 J	**99.2 J**	27.1	15
Copper	280	4,700	310	46	36	18	120	91.4 J	98.2 J	681 J	138 J	56.2 J	78.4	28.7
Lead	6.97	800	400	14	1.9	0.83	1.9	142 R	7.5 R	12.3 J	4.5	8.5	1.1	1.7 J
Mercury	0.119	35	2.3	0.1	0.019 B	0.023 U	0.019 B	0.024	0.027	0.041 U	0.02 J	0.098	0.035 U	0.082
Nickel	34.1	2,200	150	26	4.9	5.4	18	12.5	14.3 J	310	26.6 J	15.4 J	5.3	4.7
Selenium	2.57	580	39	0.26	1.2 U	1.1 U	1.3 U	0.95 J	0.96 J	5.9 J	1 J	1.7 J	0.22 J	1.4 J
Silver	--	580	39	0.8	1.2 U	1.1 U	1.3 U	0.69	0.53 U	3.1 U	0.6 U	0.56 U	0.05 J	3.1 U
Thallium	0.27	1.2	0.078	0.14	1.2 U	1.1 U	1.3 U	0.26 J	0.31 J	**4.2**	0.58 J	0.21 J	0.055 J	3.1 U
Vanadium	482	580	39	86	240	210	200	196 J	200 J	**1,480 J**	228 J	306 J	160	176

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SB Clay**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03	
Sample ID					13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04
Sample Date					05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10
Zinc	111	35,000	2,300	370	52	210	67	62.8	72	541	97 J	67.4 J	64.5 J	48.1 J
Wet Chemistry														
% Solids (pct)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons ()														
Diesel fuel (UG/KG)	--	--	--	--	2,700 J	2,600 J	3,200 J	NA	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	--	--	--	--	NA	NA	NA	11,000 U	11,000 U	12,000 U	12,000 U	13,000	11,000 U	13,000 U

Notes:
Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
[2] SSLs are Risk-Based if there is no MCL-Based value.
NA - Not analyzed
DAF - dilution attenuation factor
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
mg/kg - Milligrams per kilogram
pct - Percent
µg/kg - Micrograms per kilogram

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background SB Clay	Industrial Soil Adjusted RSLs[1] (Jan 2015)	Residential Soil Adjusted RSLs[1] (Jan 2015)	SSLs[2] (DAF 1) (Jan 2015)	67GW04		67GW05		67GW06			67GW07		67GW08	
Sample ID					67SB04-01	67SB04-03	67SB05-01	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05
Sample Date					03/25/10	03/25/10	03/24/10	03/24/10	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10
Chemical Name															
Volatile Organic Compounds (µg/kg)															
2-Butanone	--	19,000,000	2,700,000	1,200	9.3 U	7.2 J	12 U	12 U	11 U	9.9 U	12 U	2.2 J	14 U	9.6 UJ	11 U
2-Hexanone	--	130,000	20,000	8.8	9.3 U	11 U	12 U	12 U	11 U	9.9 U	12 U	11 U	14 U	9.6 UJ	11 U
Acetone	--	67,000,000	6,100,000	2,900	19 U	61	47	12 U	88	52	21 U	29	17 U	61 J	11 U
Benzene	--	5,100	1,200	2.6	0.45 J	4.6 U	4.7 U	4.7 U	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U
Carbon disulfide	--	350,000	77,000	240	3.7 U	5	4.7 U	4.7 U	4.2 UJ	4.7 J	4.7 U	0.65 J	5.5 U	3.8 UJ	4.4 U
Chlorobenzene	--	130,000	28,000	68	3.7 U	4.6 U	4.7 U	4.7 U	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U
Chloromethane	--	46,000	11,000	49	3.7 U	4.6 U	4.7 U	4.7 U	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U
Iodomethane	--	--	--	--	3.7 U	1.5 J	4.7 U	4.7 U	1.3 J	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U
m- and p-Xylene	--	240,000	55,000	190	7.5 U	9.1 U	9.3 U	9.3 U	8.5 U	7.9 U	9.4 U	8.5 U	0.32 J	7.7 UJ	8.8 U
Tetrachloroethene	--	39,000	8,100	2.3	3.7 U	4.6 U	4.7 U	4.7 U	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U
Xylene, total	--	250,000	58,000	9,800	3.7 U	4.6 U	4.7 U	4.7 U	4.2 U	4 U	4.7 U	4.3 U	0.31 J	3.8 UJ	4.4 U
Semivolatile Organic Compounds (µg/kg)															
2-Methylnaphthalene	--	300,000	23,000	190	8.9 U	10 U	10 U	11 U	9.7 U	9.3 U	0.93 J	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Acenaphthylene	--	4,500,000	350,000	5,500	1.2 J	10 U	10 U	11 U	9.7 U	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Anthracene	--	23,000,000	1,700,000	58,000	1.5 J	10 U	10 U	11 U	0.52 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Benzo(a)anthracene	--	2,900	150	12	4.8 J	10 U	10 U	11 U	0.83 J	9.3 U	10 UJ	9.5 U	11 U	9.7 U	11 U
Benzo(a)pyrene	--	290	15	240	5.6 J	10 U	10 U	11 U	0.47 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Benzo(b)fluoranthene	--	2,900	150	41	4.6 J	10 U	10 UJ	11 UJ	0.79 J	9.3 UJ	10 UJ	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Benzo(g,h,i)perylene	--	--	--	--	3.6 J	0.79 J	10 U	11 U	1 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Benzo(k)fluoranthene	--	29,000	1,500	400	8.9 U	10 U	10 U	11 U	0.51 J	9.3 UJ	10 UJ	9.5 U	11 U	9.7 U	11 U
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	49 J	61 J	210 U	220 U	200 U	190 U	200 U	200 U	220 U	200 U	220 U
Chrysene	--	290,000	15,000	1,200	6.4 J	10 U	10 U	11 U	0.74 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Dibenz(a,h)anthracene	--	290	15	13	8.9 U	10 U	10 U	11 U	9.7 UJ	9.3 U	10 UJ	9.5 U	11 U	9.7 U	11 U
Di-n-butylphthalate	--	8,200,000	620,000	2,300	180 U	210 U	210 U	220 U	200 U	190 U	200 U	24 J	29 J	21 J	220 U
Fluoranthene	--	3,000,000	230,000	89,000	16	10 U	10 U	11 U	1.6 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	5.4 J	10 U	10 U	11 U	0.5 J	9.3 U	10 UJ	9.5 UJ	11 UJ	9.7 UJ	11 UJ
Naphthalene	--	17,000	3,800	0.54	8.9 U	10 U	10 U	11 U	9.7 U	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Phenanthrene	--	--	--	--	6.3 J	10 U	10 U	11 U	2.2 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Pyrene	--	2,300,000	170,000	13,000	13	0.73 J	10 U	11 U	1.4 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U
Herbicides (µg/kg)															
No Detections															
Explosives (µg/kg)															
No Detections															
Total Metals (mg/kg)															
Antimony	--	47	3.1	0.27	1.1 UJ	0.2 J	1.2 UJ	1.2 UJ	1.2 UJ	1.1 UJ	1.2 UJ	1.1 UJ	5.9 UJ	1.1 UJ	1.2 UJ
Arsenic	3.15	3	0.67	0.29	0.85	0.95	1.4	0.97	1.8	0.6	0.28 J	0.71	3 U	0.95	0.62 U
Barium	347	22,000	1,500	82	66.9	139	22.6	55.4	122 J	174 J	4.5 J	99	87.4	112	58.6
Beryllium	0.672	230	16	3.2	0.18 J	0.57	0.21 J	0.097 J	0.63	0.31 J	0.23 J	0.15 J	1.4 J	0.42 J	0.071 J
Cadmium	0.603	98	7	0.38	0.27 J	0.4 J	0.13 J	0.59 U	0.38 J	0.21 J	0.068 J	0.16 J	0.31 J	0.33 J	0.15 J
Chromium	167	6.3	0.3	100,000	**41.7 J**	**22.4 J**	**20.4**	**9.6**	**36.6 J**	**14.6 J**	2.5 J	**7.5**	**76.9**	**10.8**	**7.1**
Cobalt	49.8	35	2.3	0.27	22.7	**39.5**	11.6 J	1.9 J	**105 J**	**44 J**	5.2 J	29.6 J	**75.2 J**	**58.8 J**	20.3 J
Copper	280	4,700	310	46	92.3	42.1	34.5 J	29.3 J	44.9 J	37.8 J	13.6 J	71 J	493 J	36 J	39.5 J
Lead	6.97	800	400	14	8.3	4.4	4.7 J	2.1 J	9 J	4.3 J	2.5	0.91 J	5.2 J	27.4 J	0.62 U
Mercury	0.119	35	2.3	0.1	0.035 U	0.12	0.22	0.043 U	0.13	0.032 J	0.04 U	0.038 U	0.043 U	0.093	0.042 U
Nickel	34.1	2,200	150	26	15.8	6.6	3.4	1.3	9.4 J	5.3 J	1.6 J	6	26	5	5.6
Selenium	2.57	580	39	0.26	0.37 J	2.2 J	2.4 J	1.3 J	2.4 J	1.1 J	0.59 J	0.41 J	2.6 J	1.8 J	0.33 J
Silver	--	580	39	0.8	0.54 U	0.099 J	0.62 U	0.59 U	0.58 U	0.56 U	0.6 U	0.53 U	3 U	0.57 U	0.62 U
Thallium	0.27	1.2	0.078	0.14	0.039 J	0.059 J	0.061 J	0.035 J	0.2 J	0.076 J	0.6 U	0.036 J	3 U	0.066 J	0.62 U
Vanadium	482	580	39	86	143	233	267 J	155 J	325 J	188 J	105 J	161 J	**821 J**	174 J	196 J

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SB Clay**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	67GW04		67GW05		67GW06			67GW07		67GW08	
Sample ID					67SB04-01	67SB04-03	67SB05-01	67SB05-05	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05
Sample Date					03/25/10	03/25/10	03/24/10	03/24/10	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10
Zinc	111	35,000	2,300	370	55.5 J	63.4 J	19.6	15.6	72.7 J	36.8 J	40 J	68.3	298	64.6	56.8
Wet Chemistry															
% Solids (pct)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons ()															
Diesel fuel (UG/KG)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	--	--	--	--	11,000 U	12,000 U	18,000	13,000 U	12,000 U	11,000 U	12,000 U	14,000	14,000	16,000	20,000

Notes:
Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
[2] SSLs are Risk-Based if there is no MCL-Based value.
NA - Not analyzed
DAF - dilution attenuation factor
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
mg/kg - Milligrams per kilogram
pct - Percent
µg/kg - Micrograms per kilogram

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	CLEAN NAPR Background SB Clay	Industrial Soil Adjusted RSLs[1] (Jan 2015)	Residential Soil Adjusted RSLs[1] (Jan 2015)	SSLs[2] (DAF 1) (Jan 2015)	67SB09		67SB09R		67SB10	67SB11
Sample ID					NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507	NAPR-W67-SB11-0507
Sample Date					01/24/14	01/24/14	07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name										
Volatile Organic Compounds (µg/kg)										
2-Butanone	--	19,000,000	2,700,000	1,200	NA	NA	NA	NA	NA	NA
2-Hexanone	--	130,000	20,000	8.8	NA	NA	NA	NA	NA	NA
Acetone	--	67,000,000	6,100,000	2,900	NA	NA	NA	NA	NA	NA
Benzene	--	5,100	1,200	2.6	NA	NA	NA	NA	NA	NA
Carbon disulfide	--	350,000	77,000	240	NA	NA	NA	NA	NA	NA
Chlorobenzene	--	130,000	28,000	68	NA	NA	NA	NA	NA	NA
Chloromethane	--	46,000	11,000	49	NA	NA	NA	NA	NA	NA
Iodomethane	--	--	--	--	NA	NA	NA	NA	NA	NA
m- and p-Xylene	--	240,000	55,000	190	NA	NA	NA	NA	NA	NA
Tetrachloroethene	--	39,000	8,100	2.3	NA	NA	NA	NA	NA	NA
Xylene, total	--	250,000	58,000	9,800	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/kg)										
2-Methylnaphthalene	--	300,000	23,000	190	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	4,500,000	350,000	5,500	NA	NA	NA	NA	NA	NA
Anthracene	--	23,000,000	1,700,000	58,000	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	2,900	150	12	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	--	290	15	240	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	--	2,900	150	41	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	--	--	--	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	--	29,000	1,500	400	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	NA	NA	NA	NA	NA	NA
Chrysene	--	290,000	15,000	1,200	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	290	15	13	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	--	8,200,000	620,000	2,300	NA	NA	NA	NA	NA	NA
Fluoranthene	--	3,000,000	230,000	89,000	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	NA	NA	NA	NA	NA	NA
Naphthalene	--	17,000	3,800	0.54	NA	NA	NA	NA	NA	NA
Phenanthrene	--	--	--	--	NA	NA	NA	NA	NA	NA
Pyrene	--	2,300,000	170,000	13,000	NA	NA	NA	NA	NA	NA
Herbicides (µg/kg)										
No Detections										
Explosives (µg/kg)										
No Detections										
Total Metals (mg/kg)										
Antimony	--	47	3.1	0.27	NA	NA	NA	NA	NA	NA
Arsenic	3.15	3	0.67	0.29	NA	NA	NA	NA	NA	NA
Barium	347	22,000	1,500	82	NA	NA	NA	NA	NA	NA
Beryllium	0.672	230	16	3.2	NA	NA	NA	NA	NA	NA
Cadmium	0.603	98	7	0.38	NA	NA	NA	NA	NA	NA
Chromium	167	6.3	0.3	100,000	NA	NA	NA	NA	NA	NA
Cobalt	49.8	35	2.3	0.27	7.4	7.2	24.8	25.9	18.8	26.1
Copper	280	4,700	310	46	NA	NA	NA	NA	NA	NA
Lead	6.97	800	400	14	NA	NA	NA	NA	NA	NA
Mercury	0.119	35	2.3	0.1	NA	NA	NA	NA	NA	NA
Nickel	34.1	2,200	150	26	NA	NA	NA	NA	NA	NA
Selenium	2.57	580	39	0.26	NA	NA	NA	NA	NA	NA
Silver	--	580	39	0.8	NA	NA	NA	NA	NA	NA
Thallium	0.27	1.2	0.078	0.14	NA	NA	NA	NA	NA	NA
Vanadium	482	580	39	86	NA	NA	NA	NA	NA	NA

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SB Clay**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	67SB09		67SB09R		67SB10	67SB11
Sample ID					NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507	NAPR-W67-SB11-0507
Sample Date					01/24/14	01/24/14	07/03/14	07/03/14	07/03/14	07/03/14
Zinc	111	35,000	2,300	370	NA	NA	NA	NA	NA	NA
Wet Chemistry										
% Solids (pct)	--	--	--	--	88	88	83	82	84	87
Total Petroleum Hydrocarbons ()										
Diesel fuel (UG/KG)	--	--	--	--	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	--	--	--	--	NA	NA	NA	NA	NA	NA

Notes:
Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
[2] SSLs are Risk-Based if there is no MCL-Based value.
NA - Not analyzed
DAF - dilution attenuation factor
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
mg/kg - Milligrams per kilogram
pct - Percent
µg/kg - Micrograms per kilogram

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SB Clay**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	67SB12		67SB13	67SB14
Sample ID					NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date					07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name								
Volatile Organic Compounds (µg/kg)								
2-Butanone	--	19,000,000	2,700,000	1,200	NA	NA	NA	NA
2-Hexanone	--	130,000	20,000	8.8	NA	NA	NA	NA
Acetone	--	67,000,000	6,100,000	2,900	NA	NA	NA	NA
Benzene	--	5,100	1,200	2.6	NA	NA	NA	NA
Carbon disulfide	--	350,000	77,000	240	NA	NA	NA	NA
Chlorobenzene	--	130,000	28,000	68	NA	NA	NA	NA
Chloromethane	--	46,000	11,000	49	NA	NA	NA	NA
Iodomethane	--	--	--	--	NA	NA	NA	NA
m- and p-Xylene	--	240,000	55,000	190	NA	NA	NA	NA
Tetrachloroethene	--	39,000	8,100	2.3	NA	NA	NA	NA
Xylene, total	--	250,000	58,000	9,800	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/kg)								
2-Methylnaphthalene	--	300,000	23,000	190	NA	NA	NA	NA
Acenaphthylene	--	4,500,000	350,000	5,500	NA	NA	NA	NA
Anthracene	--	23,000,000	1,700,000	58,000	NA	NA	NA	NA
Benzo(a)anthracene	--	2,900	150	12	NA	NA	NA	NA
Benzo(a)pyrene	--	290	15	240	NA	NA	NA	NA
Benzo(b)fluoranthene	--	2,900	150	41	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	--	--	--	NA	NA	NA	NA
Benzo(k)fluoranthene	--	29,000	1,500	400	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	--	160,000	38,000	1,400	NA	NA	NA	NA
Chrysene	--	290,000	15,000	1,200	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	290	15	13	NA	NA	NA	NA
Di-n-butylphthalate	--	8,200,000	620,000	2,300	NA	NA	NA	NA
Fluoranthene	--	3,000,000	230,000	89,000	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	2,900	150	240	NA	NA	NA	NA
Naphthalene	--	17,000	3,800	0.54	NA	NA	NA	NA
Phenanthrene	--	--	--	--	NA	NA	NA	NA
Pyrene	--	2,300,000	170,000	13,000	NA	NA	NA	NA
Herbicides (µg/kg)								
No Detections								
Explosives (µg/kg)								
No Detections								
Total Metals (mg/kg)								
Antimony	--	47	3.1	0.27	NA	NA	NA	NA
Arsenic	3.15	3	0.67	0.29	NA	NA	NA	NA
Barium	347	22,000	1,500	82	NA	NA	NA	NA
Beryllium	0.672	230	16	3.2	NA	NA	NA	NA
Cadmium	0.603	98	7	0.38	NA	NA	NA	NA
Chromium	167	6.3	0.3	100,000	NA	NA	NA	NA
Cobalt	49.8	35	2.3	0.27	**36.2**	29.3	**36.5**	25.5
Copper	280	4,700	310	46	NA	NA	NA	NA
Lead	6.97	800	400	14	NA	NA	NA	NA
Mercury	0.119	35	2.3	0.1	NA	NA	NA	NA
Nickel	34.1	2,200	150	26	NA	NA	NA	NA
Selenium	2.57	580	39	0.26	NA	NA	NA	NA
Silver	--	580	39	0.8	NA	NA	NA	NA
Thallium	0.27	1.2	0.078	0.14	NA	NA	NA	NA
Vanadium	482	580	39	86	NA	NA	NA	NA

TABLE 5-2
Subsurface Soil Detections and Exceedances of Screening Criteria
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Station ID	**CLEAN NAPR Background SB Clay**	**Industrial Soil Adjusted RSLs[1] (Jan 2015)**	**Residential Soil Adjusted RSLs[1] (Jan 2015)**	**SSLs[2] (DAF 1) (Jan 2015)**	67SB12		67SB13	67SB14
Sample ID					NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date					07/03/14	07/03/14	07/03/14	07/03/14
Zinc	111	35,000	2,300	370	NA	NA	NA	NA
Wet Chemistry								
% Solids (pct)	--	--	--	--	82	77	87	84
Total Petroleum Hydrocarbons ()								
Diesel fuel (UG/KG)	--	--	--	--	NA	NA	NA	NA
TPH-diesel range (UG/KG)	--	--	--	--	NA	NA	NA	NA

Notes:
Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
[2] SSLs are Risk-Based if there is no MCL-Based value.
NA - Not analyzed
DAF - dilution attenuation factor
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
mg/kg - Milligrams per kilogram
pct - Percent
µg/kg - Micrograms per kilogram

TABLE 5-3

Groundwater Detections and Exceedances of Screening Criteria

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico

Station ID	**MCL - Groundwater**	**CLEAN NAPR Background GW**	**Puerto Rico Water Quality Class SG**	**Tapwater Adjusted RSLs[1] (Jan 2015)**	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID					13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date					05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Chemical Name															
Volatile Organic Compounds (µg/l)															
2-Butanone	--	--	--	560	10 U	10 U	2.5 R	2.5 R	2.5 R	2.5 R	5.2 J	2.5 R	2.5 R	2.5 R	2.5 R
Acetone	--	--	--	1,400	8 J	7 J	11 J	12 J	2.5 R	7.9 J	30 J	6 J	3.9 R	2.5 R	2.5 R
Benzene	5	--	5	0.45	1 U	1 U	0.031 J	0.5 U	0.5 U	0.5 U	0.11 J	0.053 J	0.5 U	0.5 U	0.5 U
Carbon disulfide	--	--	--	81	1 U	1.1	0.35 J	0.72	0.32 J	0.87	2.2	0.82	0.04 J	0.048 J	0.048 J
Iodomethane	--	--	--	--	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.25 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Semivolatile Organic Compounds (µg/l)															
2-Methylnaphthalene	--	--	--	3.6	10 U	10 U	0.042 J	0.033 J	0.21 U	0.037 J	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Acenaphthylene	--	--	--	53	10 U	10 U	0.2 U	0.046 J	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 UJ	0.21 UJ
Benzo(a)anthracene	--	--	0.038	0.034	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 UJ	0.022 J
Benzo(b)fluoranthene	--	--	0.038	0.034	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.014 J
Benzo(k)fluoranthene	--	--	0.038	0.34	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.02 J
Chrysene	--	--	0.038	3.4	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.027 J
Fluoranthene	--	--	130	80	10 U	10 U	0.01 J	0.034 J	0.016 J	0.01 J	0.017 J	0.015 J	0.22 U	0.21 U	0.035 J
Fluorene	--	--	1,100	29	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.06 J	0.22 U	0.21 U	0.21 U
Naphthalene	--	--	--	0.17	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	**1**	0.21 U	0.21 U
Phenanthrene	--	--	--	--	10 U	10 U	0.2 U	0.068 J	0.21 U	0.21 U	0.22 U	0.042 J	0.22 U	0.21 U	0.21 U
Pyrene	--	--	830	12	10 U	10 U	0.2 U	0.019 J	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.033 J
Pyridine	--	--	--	2	50 U	50 U	5 U	5.3 U	5.3 U	5.1 U	1.6 J	5.1 U	5.6 U	5.3 U	5.3 U
Herbicides (µg/l)															
No Detections															
Explosives (µg/l)															
No Detections															
Total Metals (µg/l)															
Antimony	6	18.2	5.6	0.78	NA	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.23 J	2 U
Arsenic	10	23.2	10	0.052	NA	NA	**2.2**	**2.2**	**2.9**	**9.8**	**3.4**	**3**	**1.1**	**1.2**	**1.3**
Barium	2,000	865	--	380	NA	NA	108	24.2	12.4	65.4	60.5	41.2	9 J	4.6 J	5.1 J
Cadmium	5	46.7	5	0.92	NA	NA	0.068 J	0.094 J	1 U	0.14 J	0.097 J	0.12 J	1 U	0.055 J	0.051 J
Chromium	100	263	100	0.035	NA	NA	**1.7 J**	**0.52 J**	**0.37 J**	**1.4 J**	**3.6**	**1 J**	**0.45 J**	**0.44 J**	**0.46 J**
Cobalt	--	778	--	0.6	NA	NA	**10.4**	**4.4**	**4.7**	**5.5**	**6.2**	**2.7**	**0.66 J**	**2.6**	**2.7**
Copper	1,300	413	1,300	80	20 U	3.2 B	24.5	7.6	7.4	23.2	16	15.5	5.8	5.6	5.1
Mercury	2	0.191	0.05	0.57	NA	NA	0.19 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	--	128	610	39	NA	NA	3.9	4	3.3	6.3	5.7	3.8	1 U	1.4	1.4
Selenium	50	41.6	50	10	NA	NA	7.3	4.5 J	5.3	**37.2**	**12.8**	9.6	5.8	7.6	7.8
Thallium	2	--	0.24	0.02	NA	NA	**0.2 J**	**0.37 J**	**0.13 J**	**0.38 J**	**0.16 J**	**0.29 J**	1 U	**0.051 J**	1 U
Vanadium	--	696	--	8.6	NA	NA	**15**	**9.4**	**87.3**	**38.4**	**10.2**	**13.4**	**41.4**	**49.5**	**52.7**
Zinc	--	1,540	--	600	NA	NA	9.2	13	7.6	15.4	14.3	9.3	3.3	2.4	2.2

TABLE 5-3

Groundwater Detections and Exceedances of Screening Criteria

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico

Station ID	**MCL - Groundwater**	**CLEAN NAPR Background GW**	**Puerto Rico Water Quality Class SG**	**Tapwater Adjusted RSLs[1] (Jan 2015)**	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID					13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date					05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Dissolved Metals (µg/l)															
Antimony, Dissolved	6	2.9	5.6	0.78	20 U	20 U	0.48 J	0.35 J	0.41 J	0.48 J	**0.84 J**	0.52 J	2 U	2 U	2 U
Arsenic, Dissolved	10	17.5	10	0.052	10 U	10 U	**2.3**	**2.1**	**3.1**	**6.4**	**4.6**	**3**	**1.2**	**1.3**	**1.1**
Barium, Dissolved	2,000	289	--	380	6.1 B	43	84.9	13.6	12.3	36.7	52.7	39.5	9.6 J	4.8 J	4.8 J
Cadmium, Dissolved	5	40.2	5	0.92	5 U	5 U	0.1 J	0.053 J	1 U	0.066 J	0.76 J	0.061 J	1 U	0.062 J	0.059 J
Chromium, Dissolved	100	4.86	100	0.035	10 U	10 U	**0.48 J**	2 U	**0.28 J**	**0.6 J**	**0.77 J**	**0.73 J**	**0.45 J**	**0.34 J**	**0.49 J**
Cobalt, Dissolved	--	1,300	--	0.6	10 U	1.4 B	**6.6**	**3.3**	**4.5**	**2.6**	**35.7**	**2.3**	**0.64 J**	**2.4**	**2.5**
Copper, Dissolved	1,300	323	1,300	80	NA	NA	42.5	19.2	17.5	36.3	31.3	29.3	11.3	5	9.5
Nickel, Dissolved	--	103	610	39	2.3 B	4 B	3.3	3.3	3.7	3.7	**45.8**	3.3	0.88 J	1.3	1.5
Selenium, Dissolved	50	27.1	50	10	10 U	10 U	7.6	4.1 J	6	**23.7**	**17.3**	**10.1**	6.3	8.1	7.9
Thallium, Dissolved	2	--	0.24	0.02	10 U	10 U	**0.34 J**	**0.39 J**	**0.15 J**	**0.26 J**	**0.61 J**	**0.27 J**	1 U	1 U	1 U
Vanadium, Dissolved	--	72.9	--	8.6	**67**	**38**	8.6 J	8.1 J	**90.9 J**	**21.4 J**	8.3 J	**12.6 J**	**45.5 J**	**52.8 J**	**53.2 J**
Zinc, Dissolved	--	421	--	600	3.3 B	5.8 B	7.3	6.9	5	5.2	181	8.4	2.3	2.5	2.1
Wet Chemistry															
No Detections															
Total Petroleum Hydrocarbons ()															
Diesel fuel (UG/L)	--	--	--	--	810	710	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Identification of Gasoline (UG/L)	--	--	--	--	14 J	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Grey shading indicates exceedance of MCL-Groundwater.

Bold box indicates exceedance of NAPR Backgound GW.

Underline indicates exceedance of PRWQ Class SG.

Bold text indicates exceedance of RSLs Tap Water Adjusted.

[1] RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/l - Milligrams per liter

µg/l - Micrograms per liter

TABLE 5-4
HHRA COPC Summary Table - Residential Land Use
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Site: SWMU-67
Media: Surface Soil, Total Soil, and Groundwater

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 Threshold Value (2)	Max Exceeds BTV	Carcinogenic RSL ELCR=1.0E-6 (3)	Noncarcinogenic RSL HQ=1 (4)	Final Adjusted RSL (4)	Basis	PRWQS Class SG (5)	Frequency of RSL Exceedance (6)	Frequency of PRWQS Exceedance (6)	Max Exceeds 100X RSL (6)	Max Exceeds 100X PRWQS Class SG	EPC (7)	Statistic	Basis	Note	Target Organ	ELCR (10)	HQ (10)
Surface Soil	7440-38-2	Arsenic	0.23	J	5		mg/kg	67SS02	13 / 15	1.80E-01 - 3.60E-01	2.75	Yes	0.67	34	0.67	ca	--	11 / 15	--	No	--	2.5	95% GROS Adjusted Gamma	UCL	(8)	Skin, Vascular	4E-06	0.07
	7440-47-3	Chromium	13		47.9	J	mg/kg	67SS02	15 / 15	1.60E-01 - 3.20E-01	55	No	--	120000	0.30	ca	--	15 / 15	--	Yes	--	--	--	--	(8)	--	--	--
	7440-48-4	Cobalt	10.6	J	45.6	J	mg/kg	67SD02	15 / 15	2.10E-02 - 4.30E-02	52.3	No	368	23	2.3	nc	--	15 / 15	--	No	--	--	--	--	(8)	--	--	--
	7440-28-0	Thallium	0.022	J	0.3	J	mg/kg	67SB02-00	14 / 15	1.80E-02 - 3.60E-02	--	--	--	0.78	0.078	nc	--	4 / 15	--	No	--	--	--	--	(8)	--	--	--
	7440-62-2	Vanadium	88.5	J	371	J	mg/kg	67SD02	15 / 15	2.80E-01 - 5.50E-01	286	Yes	--	390	39	nc	--	15 / 15	--	No	--	--	--	--	(8)	--	--	--
	50-32-8	Benzo(a)pyrene	0.0006	J	0.07		mg/kg	67SD05	8 / 15	4.10E-04 - 8.20E-04	--	--	0.015	--	0.015	ca	--	1 / 15	--	No	--	0.031	95% Adjusted Gamma KM-UCL	UCL	(8)	--	2E-06	--
	53-70-3	Dibenz(a,h)anthracene	0.0005	J	0.028		mg/kg	67SD05	6 / 15	3.50E-04 - 7.10E-04	--	--	0.015	--	0.015	ca	--	1 / 15	--	No	--	--	--	--	(8)	--	--	--
Total Soil	7440-38-2	Arsenic	0.23	J	5		mg/kg	67SS02	22 / 26	1.80E-01 - 1.00E+00	3.15	Yes	0.67	34	0.67	ca	--	19 / 26	--	No	--	--	--	--	(8)	--	--	--
	7440-47-3	Chromium	6.7	J	233		mg/kg	67SB01-03	26 / 26	1.60E-01 - 9.30E-01	167	Yes	--	120000	0.30	ca	--	26 / 26	--	Yes	--	233	--	Max	(8)	NOE	--	0.002
	7440-48-4	Cobalt	7.4		472	J	mg/kg	67SB01-03	33 / 33	2.10E-02 - 1.20E-01	49.8	Yes	368	23	2.3	nc	--	33 / 33	--	Yes	--	106	95% Chebyshev (Mean, Sd)	UCL	(8)	Thyroid	3E-07	5
	7440-50-8	Copper	34.5	J	681	J	mg/kg	67SB01-03	26 / 26	2.90E-02 - 1.70E-01	280	Yes	--	3100	310	nc	--	1 / 26	--	No	--	681	--	Max		GI	--	0.2
	7440-02-0	Nickel	3.4		310		mg/kg	67SB01-03	26 / 26	2.60E-02 - 1.50E-01	34.1	Yes	13000	1500	150	nc	--	1 / 26	--	No	--	310	--	Max		Body Weight	2E-08	0.2
	7440-28-0	Thallium	0.022	J	4.2		mg/kg	67SB01-03	25 / 26	1.80E-02 - 1.00E-01	0.27	Yes	--	0.78	0.078	nc	--	9 / 26	--	No	--	1.3	97.5% KM (Chebyshev)	UCL	(8)	Hair	--	2
	7440-62-2	Vanadium	88.5	J	1480	J	mg/kg	67SB01-03	26 / 26	2.80E-01 - 1.60E+00	482	Yes	--	390	39	nc	--	26 / 26	--	No	--	480	95% Chebyshev (Mean, Sd)	UCL	(8)	Hair	--	1
	50-32-8	Benzo(a)pyrene	0.00047	J	0.07		mg/kg	67SD05	12 / 26	4.10E-04 - 8.20E-04	--	--	0.015	--	0.015	ca	--	1 / 26	--	No	--	--	--	--	(8)	--	--	--
	53-70-3	Dibenz(a,h)anthracene	0.0005	J	0.028		mg/kg	67SD05	6 / 26	3.50E-04 - 7.10E-04	--	--	0.015	--	0.015	ca	--	1 / 26	--	No	--	0.0045	95% KM (BCA)	UCL	(8)	--	3E-07	--
Groundwater	91-20-3	Naphthalene	1		1		ug/L	67GW07	1 / 8	3.00E-02 - 3.30E-02	--	--	0.17	6.1	0.17	ca	--	1 / 8	--	No	--	1	--	Max		Body Weight	6E-06	0.2
	7440-38-2	Arsenic	1.1		9.8		ug/L	67GW04	8 / 8	8.80E-02 - 8.80E-02	23.2	No	0.052	6.0	0.052	ca	10	8 / 8	0 / 8	Yes	No	9.8	--	Max	(9)	Skin, Vascular	2E-04	2
	7440-47-3	Chromium	0.37	J	3.6		ug/L	67GW05	8 / 8	2.40E-01 - 2.40E-01	263	No	--	22000	0.035	ca	100	8 / 8	0 / 8	Yes	No	3.6	--	Max	(9)	NOE	--	0.0002
	7440-48-4	Cobalt	0.66	J	10.4		ug/L	67GW01	8 / 8	4.50E-02 - 4.50E-02	778	No	--	6	0.6	nc	--	8 / 8	--	No	--	--	--	--	(9)	--	--	--
	7782-49-2	Selenium	4.5	J	37.2		ug/L	67GW04	8 / 8	2.90E-01 - 2.90E-01	41.6	No	--	100	10	nc	50	2 / 8	0 / 8	No	No	37.2	--	Max	(9)	Selenosis	--	0.4
	7440-28-0	Thallium	0.051	J	0.38	J	ug/L	67GW04	7 / 8	4.50E-02 - 4.50E-02	--	--	--	0.2	0.02	nc	0.24	7 / 8	3 / 8	No	No	--	--	--	(9)	--	--	--
	7440-62-2	Vanadium	9.4		87.3		ug/L	67GW03	8 / 8	1.70E-01 - 1.70E-01	696	No	--	86	8.6	nc	--	8 / 8	--	No	--	--	--	--	(9)	--	--	--
	7440-36-0_D	Antimony, Dissolved	0.35	J	0.84	J	ug/L	67GW05	6 / 8	2.00E-01 - 2.00E-01	2.9	No	--	7.8	0.78	nc	5.6	1 / 8	0 / 8	No	No	0.84	--	Max		Longevity, Blood	--	0.1
	7440-38-2_D	Arsenic, Dissolved	1.2		6.4		ug/L	67GW04	8 / 8	8.80E-02 - 8.80E-02	17.5	No	0.052	6.0	0.052	ca	10	8 / 8	0 / 8	Yes	No	--	--	--	(9)	--	--	--
	7440-47-3_D	Chromium, Dissolved	0.28	J	0.77	J	ug/L	67GW05	7 / 8	2.40E-01 - 2.40E-01	4.86	No	--	22000	0.035	ca	100	7 / 8	0 / 8	No	No	--	--	--	(9)	--	--	--
	7440-48-4_D	Cobalt, Dissolved	0.64	J	35.7		ug/L	67GW05	8 / 8	4.50E-02 - 4.50E-02	1300	No	--	6	0.6	nc	--	8 / 8	--	No	--	35.7	--	Max	(9)	Thyroid	--	6
	7440-02-0_D	Nickel, Dissolved	0.88	J	45.8		ug/L	67GW05	8 / 8	9.30E-02 - 9.30E-02	103	No	--	390	39	nc	610	1 / 8	0 / 8	No	No	45.8	--	Max		Body Weight, Respiratory	--	0.1
	7782-49-2_D	Selenium, Dissolved	4.1	J	23.7		ug/L	67GW04	8 / 8	2.90E-01 - 2.90E-01	27.1	No	--	100	10	nc	50	3 / 8	0 / 8	No	No	--	--	--	(9)	--	--	--
	7440-28-0_D	Thallium, Dissolved	0.15	J	0.61	J	ug/L	67GW05	6 / 8	4.50E-02 - 4.50E-02	--	--	--	0.2	0.02	nc	0.24	6 / 8	5 / 8	No	No	0.61	--	Max	(9)	Hair	--	3
	7440-62-2_D	Vanadium, Dissolved	8.1	J	90.9	J	ug/L	67GW03	8 / 8	1.70E-01 - 1.70E-01	72.9	Yes	--	86	8.6	nc	--	5 / 8	--	No	--	90.9	--	Max	(9)	Hair	--	1

(1) Chemicals with a maximum detected concentration (MaxDet) exceeding the adjusted RSL in an exposure medium or with a MaxDet exceeding the PRWQS (Class SG) in groundwater are presented on the table
(2) The background threshold values (BTV)s were obtained from the Background Threshold Value Evaluation technical memorandum (CH2M HILL, 2013); BTVs of clay subsurface soil were used for total soil
(3) Regional Screening Levels (RSL) (January 2015) based on an ELCR of $1x10^{-6}$ and an HQ=1.0
- RSLs for residential soil are used for surface soil and total soil
- RSLs for tapwater are used for groundwater.
(4) The final RSL: the lower of carcinogenic RSLs based on ELCR of $1x10^{-6}$ and noncarcinogenic RSLs adjusted using HQ=0.1.
(5) PRWQS obtained from the Puerto Rico Water Quality Standards Regulation for Class SG waters (August 2014).
(6) The final RSL is used as Screening Level (SL).
(7) 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 1.0, upper confidence limit (UCL) on mean is used as EPC for surface and total soil.
(8) When a chemical was detected both in surface soil and total soil, the higher EPCs in two media are used for the risk calculation.
(9) When a metal was detected both in total and dissolved phases, the higher EPCs in two phases are used for the risk calculation.
(10) Noncarcinogenic hazard quotient and ELCR are estimated using the ratio of RSL and EPC.
- HQ = EPC / Noncarcinogenic RSL (based on HQ=1.0)
- ELCR = EPC x $1x10^{-6}$ / Carcinogenic RSL (based on ELCR=$1x10^{-6}$)

The SL for 'Antimony (metallic)' was used as the adjusted SL for Dissolved Antimony
The SL for for 'Cadmium (water)' was used as the adjusted SL for Dissolved Cadmium
The SL for 'Chromium (VI)' was used as the adjusted SL for Chromium. The expected form of chromium is Chromium (III). Therefore, the SL for 'Chromium (III)' wa used as the Cancer and Noncancer Toxicity screening value.
The SL for 'Nickel Soluble Salts' was used as the adjusted SL for Nickel.
The SL for 'Vanadium and Compounds' was used as the adjusted SL for Vanadium

ELCR = excess lifetime cancer risk
EPC = exposure point concentration
HI = hazard index
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
mg/kg = milligram per kilogram
ug/L = microgram per liter
NAPR = Naval Activity Puerto Rico
PRWQS = Puerto Rico Water Quality Standard
RSL = Regional Screening Level
RSL Basis: ca = Carcinogenic; nc = Noncarcinogenic
SL = screening level
Target Organ: NOE = no observed effect; GI=gastrointestinal
UCL = upper confidence limit

SWMU-67 Cumulative Risk	ELCR	Max HI *
Soil	6E-06	5
Groundwater	2E-04	6
HI is based on effect on thyroid		

Total Risk	2E-04	11
* Max HI is the highest HI associated with any target organ.		

TABLE 5-5
HHRA COPC Summary Table - Industrial Land Use
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico

Site: SWMU-67
Media: Surface Soil, Total Soil, and Groundwater

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 Threshold Value (2)	Max Exceeds BTV	Carcinogenic RSL ELCR=1.0E-6 (3)	Noncarcinogenic RSL HQ=1 (4)	Final Adjusted RSL (4)	Basis	PRWQS Class SG (5)	Frequency of RSL Exceedance (6)	Frequency of PRWQS Exceedance (6)	Max Exceeds 100X RSL (6)	Max Exceeds 100X PRWQS Class SG	EPC (7)	Statistic	Basis	Note	Target Organ	ELCR (10)	HQ (10)
Surface Soil	7440-38-2	Arsenic	0.23	J	5		mg/kg	67SS02	13 / 15	1.80E-01 - 3.60E-01	2.75	Yes	3	480	3	ca	--	1 / 15	--	No	--	2.5	95% GROS Adjusted Gamma	UCL	(8)	Skin, Vascular	8E-07	0.005
	7440-47-3	Chromium	13		47.9	J	mg/kg	67SS02	15 / 15	1.60E-01 - 3.20E-01	55	No	--	63	6.3	ca	--	15 / 15	--	No	--	--	--	--	(8)	--	--	--
	7440-48-4	Cobalt	10.6	J	45.6	J	mg/kg	67SD02	15 / 15	2.10E-02 - 4.30E-02	52.3	No	1900	350	35	nc	--	4 / 15	--	No	--	--	--	--	(8)	--	--	--
Total Soil	7440-38-2	Arsenic	0.23	J	5		mg/kg	67SS02	22 / 26	1.80E-01 - 1.00E+00	3.15	Yes	3	480	3	ca	--	1 / 26	--	No	--	--	--	--	(8)	--	--	--
	7440-47-3	Chromium	6.7	J	233		mg/kg	67SB01-03	26 / 26	1.60E-01 - 9.30E-01	167	Yes	--	1800000	6.3	ca	--	26 / 26	--	No	--	233	--	Max	(8)	NOE	--	0.0001
	7440-48-4	Cobalt	7.4		472	J	mg/kg	67SB01-03	33 / 33	2.10E-02 - 1.20E-01	49.8	Yes	1900	350	35	nc	--	11 / 33	--	No	--	106	95% Chebyshev (Mean, Sd)	UCL	(8)	Thyroid	6E-08	0.3
	7440-28-0	Thallium	0.022	J	4.2		mg/kg	67SB01-03	25 / 26	1.80E-02 - 1.00E-01	0.27	Yes	--	12	1.2	nc	--	1 / 26	--	No	--	4.2	--	Max		Hair	--	0.4
	7440-62-2	Vanadium	88.5	J	1480	J	mg/kg	67SB01-03	26 / 26	2.80E-01 - 1.60E+00	482	Yes	--	5800	580	nc	--	1 / 26	--	No	--	1480	--	Max		Hair	--	0.3
Groundwater	91-20-3	Naphthalene	1		1		ug/L	67GW07	1 / 8	3.00E-02 - 3.30E-02	--	--	0.17	6.1	0.17	ca	--	1 / 8	--	No	--	1	--	Max		Body Weight	6E-06	0.2
	7440-38-2	Arsenic	1.1		9.8		ug/L	67GW04	8 / 8	8.80E-02 - 8.80E-02	23.2	No	0.052	6.0	0.052	ca	10	8 / 8	0 / 8	Yes	No	9.8	--	Max	(9)	Skin, Vascular	2E-04	2
	7440-47-3	Chromium	0.37	J	3.6		ug/L	67GW05	8 / 8	2.40E-01 - 2.40E-01	263	No	--	22000	0.035	ca	100	8 / 8	0 / 8	Yes	No	3.6	--	Max	(9)	NOE	--	0.0002
	7440-48-4	Cobalt	0.66	J	10.4		ug/L	67GW01	8 / 8	4.50E-02 - 4.50E-02	778	No	--	6	0.6	nc	--	8 / 8	--	No	--	--	--	--	(9)	--	--	--
	7782-49-2	Selenium	4.5	J	37.2		ug/L	67GW04	8 / 8	2.90E-01 - 2.90E-01	41.6	No	--	100	10	nc	50	2 / 8	0 / 8	No	No	37.2	--	Max	(9)	Selenosis	--	0.4
	7440-28-0	Thallium	0.051	J	0.38	J	ug/L	67GW04	7 / 8	4.50E-02 - 4.50E-02	--	--	--	0.2	0.02	nc	0.24	7 / 8	3 / 8	No	No	--	--	--	(9)	--	--	--
	7440-62-2	Vanadium	9.4		87.3		ug/L	67GW03	8 / 8	1.70E-01 - 1.70E-01	696	No	--	86	8.6	nc	--	8 / 8	--	No	--	--	--	--	(9)	--	--	--
	7440-36-0_D	Antimony, Dissolved	0.35	J	0.84	J	ug/L	67GW05	6 / 8	2.00E-01 - 2.00E-01	2.9	No	--	7.8	0.78	nc	5.6	1 / 8	0 / 8	No	No	0.84	--	Max		Longevity, Blood	--	0.1
	7440-38-2_D	Arsenic, Dissolved	1.2		6.4		ug/L	67GW04	8 / 8	8.80E-02 - 8.80E-02	17.5	No	0.052	6.0	0.052	ca	10	8 / 8	0 / 8	Yes	No	--	--	--	(9)	--	--	--
	7440-47-3_D	Chromium, Dissolved	0.28	J	0.77	J	ug/L	67GW05	7 / 8	2.40E-01 - 2.40E-01	4.86	No	--	22000	0.035	ca	100	7 / 8	0 / 8	No	No	--	--	--	(9)	--	--	--
	7440-48-4_D	Cobalt, Dissolved	0.64	J	35.7		ug/L	67GW05	8 / 8	4.50E-02 - 4.50E-02	1300	No	--	6	0.6	nc	--	8 / 8	--	No	--	35.7	--	Max	(9)	Thyroid	--	6
	7440-02-0_D	Nickel, Dissolved	0.88	J	45.8		ug/L	67GW05	8 / 8	9.30E-02 - 9.30E-02	103	No	--	390	39	nc	610	1 / 8	0 / 8	No	No	45.8	--	Max		Body Weight, Respiratory	--	0.1
	7782-49-2_D	Selenium, Dissolved	4.1	J	23.7		ug/L	67GW04	8 / 8	2.90E-01 - 2.90E-01	27.1	No	--	100	10	nc	50	3 / 8	0 / 8	No	No	--	--	--	(9)	--	--	--
	7440-28-0_D	Thallium, Dissolved	0.15	J	0.61	J	ug/L	67GW05	6 / 8	4.50E-02 - 4.50E-02	--	--	--	0.2	0.02	nc	0.24	6 / 8	5 / 8	No	No	0.61	--	Max	(9)	Hair	--	3
	7440-62-2_D	Vanadium, Dissolved	8.1	J	90.9	J	ug/L	67GW03	8 / 8	1.70E-01 - 1.70E-01	72.9	Yes	--	86	8.6	nc	--	5 / 8	--	No	--	90.9	--	Max	(9)	Hair	--	1

(1) Chemicals with a maximum detected concentration (MaxDet) exceeding the adjusted RSL in an exposure medium or with a MaxDet exceeding the PRWQS (Class SG) in groundwater are presented on the table.
(2) The background threshold values (BTV)s were obtained from the Background Threshold Value Evaluation technical memorandum (CH2M HILL, 2013); BTVs of clay soil were used for total soil.
(3) Regional Screening Levels (RSL) (January 2015) based on an ELCR of $1x10^{-6}$ and an HQ=1.0
- RSLs for industrial soil are used for surface soil and total soil.
- RSLs for tapwater are used for groundwater.
(4) The final RSL: the lower of carcinogenic RSLs based on ELCR of $1x10^{-6}$ and noncarcinogenic RSLs adjusted using HQ=0.1.
(5) PRWQS obtained from the Puerto Rico Water Quality Standards Regulation for Class SG waters (August 2014).
(6) The final RSL is used as Screening Level (SL).
(7) 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 1.0, upper confidence limit (UCL) on mean is used as EPC for surface and total soil.
(8) When a chemical was detected both in surface soil and total soil, the higher EPCs in two media are used for the risk calculation.
(9) When a metal was detected both in total and dissolved phases, the higher EPCs in two phases are used for the risk calculation.
(10) Noncarcinogenic hazard quotient and ELCR are estimated using the ratio of RSL and EPC.
- HQ = EPC / Noncarcinogenic RSL (based on HQ=1.0)
- ELCR = EPC x $1x10^{-6}$ / Carcinogenic RSL (based on ELCR=$1x10^{-6}$)

The SL for 'Antimony (metallic)' was used as the adjusted SL for Dissolved Antimony.
The SL for for 'Cadmium (water)' was used as the adjusted SL for Dissolved Cadmium.
The SL for 'Chromium (VI)' was used as the adjusted SL for Chromium. 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 'Nickel Soluble Salts' was used as the adjusted SL for Nickel.
The SL for 'Vanadium and Compounds' was used as the adjusted SL for Vanadium.

ELCR = excess lifetime cancer risk
EPC = exposure point concentration
HI = hazard index
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
mg/kg = milligram per kilogram
ug/L = microgram per liter
NAPR = Naval Activity Puerto Rico
PRWQS = Puerto Rico Water Quality Standard
RSL = Regional Screening Level
RSL Basis: ca = Carcinogenic; nc = Noncarcinogenic
SL = screening level
Target Organ: NOE = no observed effect; GI=gastrointestinal
UCL = upper confidence limit

SWMU-67 Cumulative Risk	ELCR	Max HI *
Soil	9E-07	0.6
Groundwater	2E-04	6
HI is based on effect on thyroid		

Total Risk	2E-04	6

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

TABLE 5-6

Ecological Screening Statistics - SWMU 67 Surface Soil - Plants and Soil Invertebrates

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Arithmetic Mean	Standard Deviation of Mean	95% UCL	Soil Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Background UTL	Frequency of UTL Exceedance	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient
Volatile Organic Compounds (UG/KG)															
2-Butanone	11.0 - 19.0	10 / 15	5.60	20.0	11.8	5.16	--	89,600	0 / 15	0.0002	--	-- / --	--	--	--
Acetone	-- - --	13 / 13	63.0	280	169	64.0	--	2,500	0 / 13	0.11	--	-- / --	--	--	--
Benzene	3.50 - 8.30	1 / 15	0.59	0.59	2.66	0.95	--	6.80	0 / 15	0.09	--	-- / --	--	--	--
Carbon disulfide	3.50 - 6.40	6 / 15	0.86	36.0	5.27	9.15	--	94.1	0 / 15	0.38	--	-- / --	--	--	--
Chloroform	3.80 - 8.30	2 / 15	0.24	0.30	2.60	1.16	--	1,844	0 / 15	0.0002	--	-- / --	--	--	--
Chloromethane	3.50 - 8.20	3 / 15	0.42	0.82	2.31	1.05	--	5,000	0 / 15	0.0002	--	-- / --	--	--	--
Iodomethane	4.40 - 6.40	10 / 15	0.70	2.90	2.21	0.75	--	1,230	0 / 15	0.002	--	-- / --	--	--	--
m- and p-Xylene	7.00 - 17.0	5 / 15	0.12	0.42	3.56	2.66	--	2,400	0 / 15	0.0002	--	-- / --	--	--	--
Methylene chloride	3.80 - 8.30	1 / 15	0.35	0.35	2.74	0.96	--	1,250	0 / 15	0.0003	--	-- / --	--	--	--
Xylene, total	3.50 - 8.30	5 / 15	0.12	0.42	1.84	1.26	--	2,400	0 / 15	0.0002	--	-- / --	--	--	--
Semivolatile Organic Compounds (UG/KG)															
bis(2-Ethylhexyl)phthalate	190 - 440	3 / 15	39.0	100	121	46.8	--	30,000	0 / 15	0.003	--	-- / --	--	--	--
Di-n-butylphthalate	180 - 360	1 / 15	23.0	23.0	115	38.9	--	40,000	0 / 15	0.001	--	-- / --	--	--	--
PAH (HMW)	45.0 - 63.0	11 / 15	12.8	674	89.1	165	--	18,000	0 / 15	0.04	--	-- / --	--	--	--
PAH (LMW)	138 - 201	9 / 15	126	338	139	70.0	--	29,000	0 / 15	0.01	--	-- / --	--	--	--
Inorganics (MG/KG)															
Antimony	1.10 - 2.00	6 / 15	0.14	1.20	0.59	0.31	0.56	78.0	0 / 15	0.02	--	-- / --	--	--	--
Arsenic	0.52 - 0.57	13 / 15	0.23	5.00	1.28	1.23	--	18.0	0 / 15	0.28	--	-- / --	--	--	--
Barium	-- - --	15 / 15	31.8	203	88.3	45.2	--	330	0 / 15	0.62	--	-- / --	--	--	--
Beryllium	-- - --	15 / 15	0.14	0.40	0.28	0.072	--	40.0	0 / 15	0.01	--	-- / --	--	--	--
Cadmium	-- - --	15 / 15	0.13	0.79	0.34	0.21	0.47	32.0	0 / 15	0.02	--	-- / --	--	--	--
Chromium	-- - --	15 / 15	13.0	47.9	31.9	10.4	36.7	64.0	0 / 15	0.75	--	-- / --	--	--	--
Cobalt	-- - --	15 / 15	10.6	45.6	28.6	10.2	--	13.0	14 / 15	3.51	52.3	0 / 15	0.87	--	--
Copper	-- - --	15 / 15	44.4	277	97.0	58.4	124	70.0	9 / 15	3.96	192	1 / 15	1.44	1.77	1.39
Lead	-- - --	15 / 15	2.10	134	26.3	34.1	49.6	120	1 / 15	1.12	34.2	3 / 15	3.92	0.41	0.22
Mercury	0.038 - 0.038	14 / 15	0.011	0.17	0.050	0.040	0.075	0.10	1 / 15	1.70	0.131	1 / 15	1.30	0.75	0.50
Nickel	-- - --	15 / 15	6.70	16.6	11.9	2.84	--	38.0	0 / 15	0.44	--	-- / --	--	--	--
Selenium	-- - --	15 / 15	0.34	2.20	1.12	0.55	1.38	0.52	11 / 15	4.23	1.07	9 / 15	2.06	2.65	2.16
Silver	0.52 - 0.99	5 / 15	0.049	0.15	0.25	0.14	--	560	0 / 15	0.0003	--	-- / --	--	--	--
Thallium	0.57 - 0.57	14 / 15	0.022	0.30	0.091	0.090	--	1.00	0 / 15	0.30	--	-- / --	--	--	--
Vanadium	-- - --	15 / 15	88.5	371	204	74.3	238	130	14 / 15	2.85	286	2 / 15	1.30	1.83	1.57
Zinc	-- - --	15 / 15	32.8	98.1	64.0	19.9	73.0	120	0 / 15	0.82	--	-- / --	--	--	--
Total Petroleum Hydrocarbons (UG/KG)															
TPH-diesel range	11,000 - 12,000	8 / 15	12,000	110,000	23,000	27,211	--	NSV	-- / --	NSV	--	-- / --	--	NSV	NSV

NSV - No Screening Value

1 - Count of detected samples exceeding or equaling Screening Value

TABLE 5-7

Screening Statistics - SWMU 67 Surface Soil - Mammal/Bird Eco-SSLs

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Mammal Eco-SSL	Frequency of Exceedance	Maximum Hazard Quotient	Bird Eco-SSL	Frequency of Exceedance	Maximum Hazard Quotient
Inorganics (MG/KG)									
Antimony	1.10 - 2.00	6 / 15	1.20	0.27	2 / 15	4.44	--	-- / --	--
Arsenic	0.52 - 0.57	13 / 15	5.00	46.0	0 / 15	0.11	43.0	0 / 15	0.12
Barium	-- - --	15 / 15	203	2,000	0 / 15	0.10	--	-- / --	--
Beryllium	-- - --	15 / 15	0.40	21.0	0 / 15	0.02	--	-- / --	--
Cadmium	-- - --	15 / 15	0.79	0.36	4 / 15	2.19	0.77	2 / 15	1.03
Chromium	-- - --	15 / 15	47.9	34.0	6 / 15	1.41	26.0	11 / 15	1.84
Cobalt	-- - --	15 / 15	45.6	230	0 / 15	0.20	120	0 / 15	0.38
Copper	-- - --	15 / 15	277	49.0	14 / 15	5.65	28.0	15 / 15	9.89
Lead	-- - --	15 / 15	134	56.0	2 / 15	2.39	11.0	9 / 15	12.2
Nickel	-- - --	15 / 15	16.6	130	0 / 15	0.13	210	0 / 15	0.08
Selenium	-- - --	15 / 15	2.20	0.63	10 / 15	3.49	1.20	9 / 15	1.83
Silver	0.52 - 0.99	5 / 15	0.15	14.0	0 / 15	0.01	4.20	0 / 15	0.04
Vanadium	-- - --	15 / 15	371	280	3 / 15	1.33	7.80	15 / 15	47.6
Zinc	-- - --	15 / 15	98.1	79.0	4 / 15	1.24	46.0	12 / 15	2.13
Semivolatile Organic Compounds (UG/KG)									
PAH (HMW)	45.0 - 63.0	11 / 15	674	1,100	0 / 15	0.61	--	-- / --	--
PAH (LMW)	138 - 201	9 / 15	338	100,000	0 / 15	0.003	--	-- / --	--

Shaded cells indicate HQ $\geq$ 1

TABLE 5-8

Summary of Norway Rat Exposure Doses - 95% UCL

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.56	1.000	5.56E-01	Regresson	2.27E-02	0.00040	2.93E-02	0.059	0.19	0.59	4.97E-01	1.57E-01	4.97E-02
Cadmium	0.47	Regression	4.51E+00	Regresson	4.09E-01	0.00100	2.40E-01	0.77	2.43	7.70	3.12E-01	9.86E-02	3.12E-02
Chromium	36.7	0.320	1.17E+01	0.041	1.50E+00	0.00044	7.17E-01	2.40	5.37	12.0	2.99E-01	1.34E-01	5.97E-02
Copper	124	Regression	1.90E+01	Regresson	1.30E+01	0.00580	1.81E+00	5.60	7.23	9.34	3.22E-01	2.50E-01	1.93E-01
Lead	49.6	Regression	1.88E+01	Regresson	2.37E+00	0.00023	1.13E+00	4.70	6.47	8.90	2.40E-01	1.74E-01	1.27E-01
Mercury	0.075	1.186	8.93E-02	Regresson	9.05E-02	0.00020	8.92E-03	0.032	0.072	0.16	2.79E-01	1.25E-01	5.57E-02
Selenium	1.38	Regression	1.17E+00	Regresson	7.22E-01	0.00380	9.53E-02	0.20	0.26	0.33	4.77E-01	3.71E-01	2.89E-01
Vanadium	238	0.039	9.28E+00	0.005	1.14E+00	0.00880	9.80E-01	4.16	5.88	8.31	2.36E-01	1.67E-01	1.18E-01
Zinc	73.0	Regression	3.49E+02	Regresson	5.23E+01	0.00560	1.97E+01	75.4	169	377	2.61E-01	1.17E-01	5.22E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0207	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.490	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.490	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.020	= Proportion of diet composed of soil
WIR =	0.0242	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.209	= Body weight (kg)

TABLE 5-9

Summary of Indian Mongoose Exposure Doses - 95% UCL

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Antimony	0.56	1.000	5.56E-01	Regresson	2.27E-02	See footnote	2.95E-01	0.00040	2.27E-02	0.059	0.19	0.59	3.85E-01	1.22E-01	3.85E-02
Cadmium	0.47	Regression	4.51E+00	Regresson	4.09E-01	Regresson	1.39E-01	0.00100	1.43E-01	0.77	2.43	7.70	1.85E-01	5.87E-02	1.85E-02
Chromium	36.7	0.320	1.17E+01	0.041	1.50E+00	Regresson	3.14E+00	0.00044	4.73E-01	2.40	5.37	12.0	1.97E-01	8.80E-02	3.94E-02
Copper	124	Regression	1.90E+01	Regresson	1.30E+01	Regresson	1.57E+01	0.00580	1.10E+00	11.7	13.3	15.1	9.38E-02	8.26E-02	7.27E-02
Lead	49.6	Regression	1.88E+01	Regresson	2.37E+00	Regresson	6.06E+00	0.00023	7.58E-01	4.70	6.47	8.90	1.61E-01	1.17E-01	8.52E-02
Mercury	0.075	1.186	8.93E-02	Regresson	9.05E-02	0.054	4.09E-03	0.00020	3.47E-03	0.15	0.19	0.25	2.31E-02	1.79E-02	1.39E-02
Selenium	1.38	Regression	1.17E+00	Regresson	7.22E-01	Regresson	7.44E-01	0.00380	5.45E-02	0.20	0.26	0.33	2.72E-01	2.12E-01	1.65E-01
Vanadium	238	0.039	9.28E+00	0.005	1.14E+00	0.010	2.47E+00	0.00880	6.90E-01	4.16	5.88	8.31	1.66E-01	1.17E-01	8.31E-02
Zinc	73.0	Regression	3.49E+02	Regresson	5.23E+01	Regresson	1.20E+02	0.00560	1.30E+01	75.4	169	377	1.72E-01	7.71E-02	3.45E-02

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet, that is, a diet to whole-body BAF of 1.0 was assumed

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0285	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.564	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.111	= Proportion of diet composed of food item (terrestrial plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (small mammals, dry weight basis)
PDFi =	0.297	= Proportion of diet composed of food item (small mammals)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.028	= Proportion of diet composed of soil
WIR =	0.0557	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.528	= Body weight (kg)

TABLE 5-10

Summary of Pearly-eyed Thrasher Exposure Doses - 95% UCL

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.56	1.000	5.56E-01	Regresson	2.27E-02	0.00040	5.33E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.47	Regression	4.51E+00	Regresson	4.09E-01	0.00100	4.15E-01	1.47	3.29	7.35	2.82E-01	1.26E-01	5.64E-02
Chromium	36.7	0.320	1.17E+01	0.041	1.50E+00	0.00044	1.28E+00	2.66	5.95	13.3	4.83E-01	2.16E-01	9.65E-02
Copper	124	Regression	1.90E+01	Regresson	1.30E+01	0.00580	2.68E+00	4.05	7.00	12.1	6.63E-01	3.84E-01	2.22E-01
Lead	49.6	Regression	1.88E+01	Regresson	2.37E+00	0.00023	2.00E+00	3.85	8.61	19.3	5.20E-01	2.33E-01	1.04E-01
Mercury	0.075	1.186	8.93E-02	Regresson	9.05E-02	0.00020	1.06E-02	0.49	0.77	1.20	2.16E-02	1.38E-02	8.80E-03
Selenium	1.38	Regression	1.17E+00	Regresson	7.22E-01	0.00380	1.30E-01	0.44	0.81	1.50	2.95E-01	1.60E-01	8.66E-02
Vanadium	238	0.039	9.28E+00	0.005	1.14E+00	0.00880	2.15E+00	0.34	0.49	0.69	**6.26E+00**	**4.43E+00**	**3.13E+00**
Zinc	73.0	Regression	3.49E+02	Regresson	5.23E+01	0.00560	3.29E+01	66.1	148	331	4.97E-01	2.22E-01	9.94E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0123 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.754 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.200 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.046 = Proportion of diet composed of soil
WIR = 0.0129 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.104 = Body weight (kg)

TABLE 5-11

Summary of Common Ground Dove Exposure Doses - 95% UCL

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.56	1.000	5.56E-01	Regresson	2.27E-02	0.00040	1.07E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.47	Regression	4.51E+00	Regresson	4.09E-01	0.00100	8.84E-02	1.47	3.29	7.35	6.01E-02	2.69E-02	1.20E-02
Chromium	36.7	0.320	1.17E+01	0.041	1.50E+00	0.00044	6.98E-01	2.66	5.95	13.3	2.62E-01	1.17E-01	5.25E-02
Copper	124	Regression	1.90E+01	Regresson	1.30E+01	0.00580	3.97E+00	4.05	7.00	12.1	9.81E-01	5.68E-01	3.28E-01
Lead	49.6	Regression	1.88E+01	Regresson	2.37E+00	0.00023	1.01E+00	1.63	2.31	3.26	6.21E-01	4.39E-01	3.11E-01
Mercury	0.075	1.186	8.93E-02	Regresson	9.05E-02	0.00020	1.92E-02	0.45	0.64	0.90	4.28E-02	3.02E-02	2.14E-02
Selenium	1.38	Regression	1.17E+00	Regresson	7.22E-01	0.00380	1.62E-01	0.29	0.41	0.58	5.60E-01	3.96E-01	2.80E-01
Vanadium	238	0.039	9.28E+00	0.005	1.14E+00	0.00880	2.78E+00	0.34	0.49	0.69	**8.08E+00**	**5.72E+00**	**4.04E+00**
Zinc	73.0	Regression	3.49E+02	Regresson	5.23E+01	0.00560	1.14E+01	66.1	148	331	1.73E-01	7.72E-02	3.45E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0069	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.950	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.050	= Proportion of diet composed of soil
WIR =	0.0059	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0320	= Body weight (kg)

TABLE 5-12

Summary of Red-tailed Hawk Exposure Doses - 95% UCL

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Antimony	0.56	1.000	5.56E-01	Regresson	2.27E-02	See footnote	2.95E-01	0.00040	9.45E-03	NA	NA	NA	NA	NA	NA
Cadmium	0.47	Regression	4.51E+00	Regresson	4.09E-01	Regresson	1.39E-01	0.00100	4.51E-03	1.47	3.29	7.35	3.07E-03	1.37E-03	6.14E-04
Chromium	36.7	0.320	1.17E+01	0.041	1.50E+00	Regresson	3.14E+00	0.00044	1.00E-01	2.66	5.95	13.3	3.78E-02	1.69E-02	7.55E-03
Copper	124	Regression	1.90E+01	Regresson	1.30E+01	Regresson	1.57E+01	0.00580	5.01E-01	4.05	7.00	12.1	1.24E-01	7.16E-02	4.14E-02
Lead	49.6	Regression	1.88E+01	Regresson	2.37E+00	Regresson	6.06E+00	0.00023	1.94E-01	3.85	8.61	19.3	5.04E-02	2.25E-02	1.01E-02
Mercury	0.075	1.186	8.93E-02	Regresson	9.05E-02	0.054	4.09E-03	0.00020	1.42E-04	0.49	0.77	1.20	2.90E-04	1.85E-04	1.18E-04
Selenium	1.38	Regression	1.17E+00	Regresson	7.22E-01	Regresson	7.44E-01	0.00380	2.40E-02	0.44	0.81	1.50	5.46E-02	2.96E-02	1.60E-02
Vanadium	238	0.039	9.28E+00	0.005	1.14E+00	0.010	2.47E+00	0.00880	7.94E-02	0.34	0.49	0.69	2.31E-01	1.63E-01	1.15E-01
Zinc	73.0	Regression	3.49E+02	Regresson	5.23E+01	Regresson	1.20E+02	0.00560	3.84E+00	66.1	148	331	5.81E-02	2.60E-02	1.16E-02

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet, that is, a diet to whole-body BAF of 1.0 was assumed

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0363	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (terrestrial plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (small mammals, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (small mammals)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
WIR =	0.0642	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	1.134	= Body weight (kg)

TABLE 5-13

Summary of Norway Rat Exposure Doses - Arithmetic Mean

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.59	1.000	5.87E-01	Regresson	2.39E-02	0.00040	3.09E-02	0.059	0.19	0.59	5.24E-01	1.66E-01	5.24E-02
Cadmium	0.34	Regression	3.53E+00	Regresson	3.46E-01	0.00050	1.89E-01	0.77	2.43	7.70	2.46E-01	7.78E-02	2.46E-02
Chromium	31.9	0.320	1.02E+01	0.041	1.31E+00	0.00044	6.24E-01	2.40	5.37	12.0	2.60E-01	1.16E-01	5.20E-02
Copper	97.0	Regression	1.79E+01	Regresson	1.18E+01	0.00580	1.64E+00	5.60	7.23	9.34	2.93E-01	2.27E-01	1.75E-01
Lead	26.3	Regression	1.13E+01	Regresson	1.66E+00	0.00023	6.80E-01	4.70	6.47	8.90	1.45E-01	1.05E-01	7.64E-02
Mercury	0.050	1.186	5.92E-02	Regresson	7.23E-02	0.00010	6.50E-03	0.032	0.072	0.16	2.03E-01	9.09E-02	4.07E-02
Selenium	1.12	Regression	1.01E+00	Regresson	5.78E-01	0.00380	7.99E-02	0.20	0.26	0.33	4.00E-01	3.11E-01	2.42E-01
Vanadium	204	0.039	7.96E+00	0.005	9.79E-01	0.00880	8.41E-01	4.16	5.88	8.31	2.02E-01	1.43E-01	1.01E-01
Zinc	64.0	Regression	3.35E+02	Regresson	4.86E+01	0.00560	1.88E+01	75.4	169	377	2.49E-01	1.11E-01	4.98E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0207	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.490	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.490	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.020	= Proportion of diet composed of soil
WIR =	0.0242	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.209	= Body weight (kg)

TABLE 5-14

Summary of Indian Mongoose Exposure Doses - Arithmetic Mean

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Antimony	0.59	1.000	5.87E-01	Regresson	2.39E-02	See footnote	3.11E-01	0.00040	2.39E-02	0.059	0.19	0.59	4.06E-01	1.28E-01	4.06E-02
Cadmium	0.34	Regression	3.53E+00	Regresson	3.46E-01	Regresson	1.17E-01	0.00050	1.12E-01	0.77	2.43	7.70	1.46E-01	4.61E-02	1.46E-02
Chromium	31.9	0.320	1.02E+01	0.041	1.31E+00	Regresson	2.84E+00	0.00044	4.13E-01	2.40	5.37	12.0	1.72E-01	7.70E-02	3.44E-02
Copper	97.0	Regression	1.79E+01	Regresson	1.18E+01	Regresson	1.47E+01	0.00580	9.98E-01	11.7	13.3	15.1	8.53E-02	7.51E-02	6.61E-02
Lead	26.3	Regression	1.13E+01	Regresson	1.66E+00	Regresson	4.58E+00	0.00023	4.66E-01	4.70	6.47	8.90	9.92E-02	7.21E-02	5.24E-02
Mercury	0.050	1.186	5.92E-02	Regresson	7.23E-02	0.054	2.71E-03	0.00010	2.37E-03	0.15	0.19	0.25	1.58E-02	1.22E-02	9.47E-03
Selenium	1.12	Regression	1.01E+00	Regresson	5.78E-01	Regresson	6.89E-01	0.00380	4.74E-02	0.20	0.26	0.33	2.37E-01	1.85E-01	1.44E-01
Vanadium	204	0.039	7.96E+00	0.005	9.79E-01	0.010	2.12E+00	0.00880	5.92E-01	4.16	5.88	8.31	1.42E-01	1.01E-01	7.13E-02
Zinc	64.0	Regression	3.35E+02	Regresson	4.86E+01	Regresson	1.19E+02	0.00560	1.25E+01	75.4	169	377	1.66E-01	7.41E-02	3.31E-02

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet, that is, a diet to whole-body BAF of 1.0 was assumed

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0285	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.564	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.111	= Proportion of diet composed of food item (terrestrial plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (small mammals, dry weight basis)
PDFi =	0.297	= Proportion of diet composed of food item (small mammals)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.028	= Proportion of diet composed of soil
WIR =	0.0557	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.528	= Body weight (kg)

TABLE 5-15

Summary of Pearly-eyed Thrasher Exposure Doses - Arithmetic Mean

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.59	1.000	5.87E-01	Regresson	2.39E-02	0.00040	5.62E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.34	Regression	3.53E+00	Regresson	3.46E-01	0.00050	3.26E-01	1.47	3.29	7.35	2.22E-01	9.92E-02	4.43E-02
Chromium	31.9	0.320	1.02E+01	0.041	1.31E+00	0.00044	1.12E+00	2.66	5.95	13.3	4.21E-01	1.88E-01	8.41E-02
Copper	97.0	Regression	1.79E+01	Regresson	1.18E+01	0.00580	2.41E+00	4.05	7.00	12.1	5.94E-01	3.44E-01	1.99E-01
Lead	26.3	Regression	1.13E+01	Regresson	1.66E+00	0.00023	1.19E+00	3.85	8.61	19.3	3.09E-01	1.38E-01	6.17E-02
Mercury	0.050	1.186	5.92E-02	Regresson	7.23E-02	0.00010	7.28E-03	0.49	0.77	1.20	1.49E-02	9.50E-03	6.07E-03
Selenium	1.12	Regression	1.01E+00	Regresson	5.78E-01	0.00380	1.11E-01	0.44	0.81	1.50	2.51E-01	1.36E-01	7.37E-02
Vanadium	204	0.039	7.96E+00	0.005	9.79E-01	0.00880	1.85E+00	0.34	0.49	0.69	**5.37E+00**	**3.80E+00**	**2.69E+00**
Zinc	64.0	Regression	3.35E+02	Regresson	4.86E+01	0.00560	3.14E+01	66.1	148	331	4.75E-01	2.12E-01	9.50E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0123	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.754	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.200	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
WIR =	0.0129	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.104	= Body weight (kg)

TABLE 5-16

Summary of Common Ground Dove Exposure Doses - Arithmetic Mean

SWMU 67 Revised Phase I RFI

Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Antimony	0.59	1.000	5.87E-01	Regresson	2.39E-02	0.00040	1.12E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.34	Regression	3.53E+00	Regresson	3.46E-01	0.00050	7.42E-02	1.47	3.29	7.35	5.05E-02	2.26E-02	1.01E-02
Chromium	31.9	0.320	1.02E+01	0.041	1.31E+00	0.00044	6.08E-01	2.66	5.95	13.3	2.29E-01	1.02E-01	4.57E-02
Copper	97.0	Regression	1.79E+01	Regresson	1.18E+01	0.00580	3.45E+00	4.05	7.00	12.1	8.52E-01	4.93E-01	2.85E-01
Lead	26.3	Regression	1.13E+01	Regresson	1.66E+00	0.00023	6.19E-01	1.63	2.31	3.26	3.80E-01	2.69E-01	1.90E-01
Mercury	0.050	1.186	5.92E-02	Regresson	7.23E-02	0.00010	1.53E-02	0.45	0.64	0.90	3.39E-02	2.40E-02	1.70E-02
Selenium	1.12	Regression	1.01E+00	Regresson	5.78E-01	0.00380	1.30E-01	0.29	0.41	0.58	4.49E-01	3.18E-01	2.25E-01
Vanadium	204	0.039	7.96E+00	0.005	9.79E-01	0.00880	2.39E+00	0.34	0.49	0.69	**6.94E+00**	**4.90E+00**	**3.47E+00**
Zinc	64.0	Regression	3.35E+02	Regresson	4.86E+01	0.00560	1.06E+01	66.1	148	331	1.60E-01	7.15E-02	3.20E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0069	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.950	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.050	= Proportion of diet composed of soil
WIR =	0.0059	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0320	= Body weight (kg)

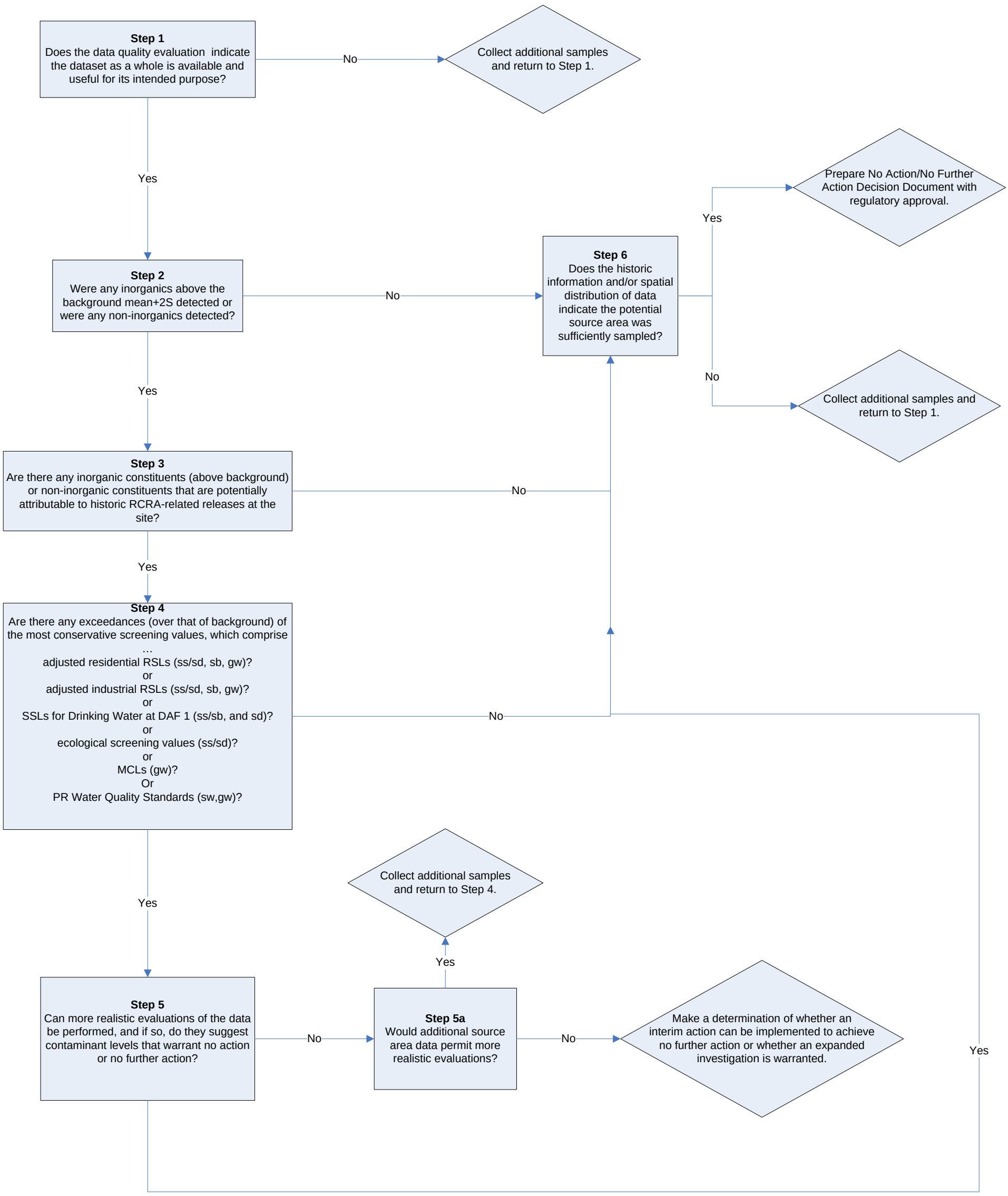
TABLE 5-17
Summary of Red-tailed Hawk Exposure Doses - Arithmetic Mean
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico, Ceiba, Puerto Rico

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Antimony	0.59	1.000	5.87E-01	Regresson	2.39E-02	See footnote	3.11E-01	0.00040	9.97E-03	NA	NA	NA	NA	NA	NA
Cadmium	0.34	Regression	3.53E+00	Regresson	3.46E-01	Regresson	1.17E-01	0.00050	3.78E-03	1.47	3.29	7.35	2.57E-03	1.15E-03	5.14E-04
Chromium	31.9	0.320	1.02E+01	0.041	1.31E+00	Regresson	2.84E+00	0.00044	9.08E-02	2.66	5.95	13.3	3.41E-02	1.53E-02	6.83E-03
Copper	97.0	Regression	1.79E+01	Regresson	1.18E+01	Regresson	1.47E+01	0.00580	4.70E-01	4.05	7.00	12.1	1.16E-01	6.71E-02	3.88E-02
Lead	26.3	Regression	1.13E+01	Regresson	1.66E+00	Regresson	4.58E+00	0.00023	1.47E-01	3.85	8.61	19.3	3.81E-02	1.70E-02	7.62E-03
Mercury	0.050	1.186	5.92E-02	Regresson	7.23E-02	0.054	2.71E-03	0.00010	9.23E-05	0.49	0.77	1.20	1.88E-04	1.20E-04	7.69E-05
Selenium	1.12	Regression	1.01E+00	Regresson	5.78E-01	Regresson	6.89E-01	0.00380	2.23E-02	0.44	0.81	1.50	5.06E-02	2.74E-02	1.49E-02
Vanadium	204	0.039	7.96E+00	0.005	9.79E-01	0.010	2.12E+00	0.00880	6.82E-02	0.34	0.49	0.69	1.98E-01	1.40E-01	9.92E-02
Zinc	64.0	Regression	3.35E+02	Regresson	4.86E+01	Regresson	1.19E+02	0.00560	3.80E+00	66.1	148	331	5.76E-02	2.57E-02	1.15E-02

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet, that is, a diet to whole-body BAF of 1.0 was assumed

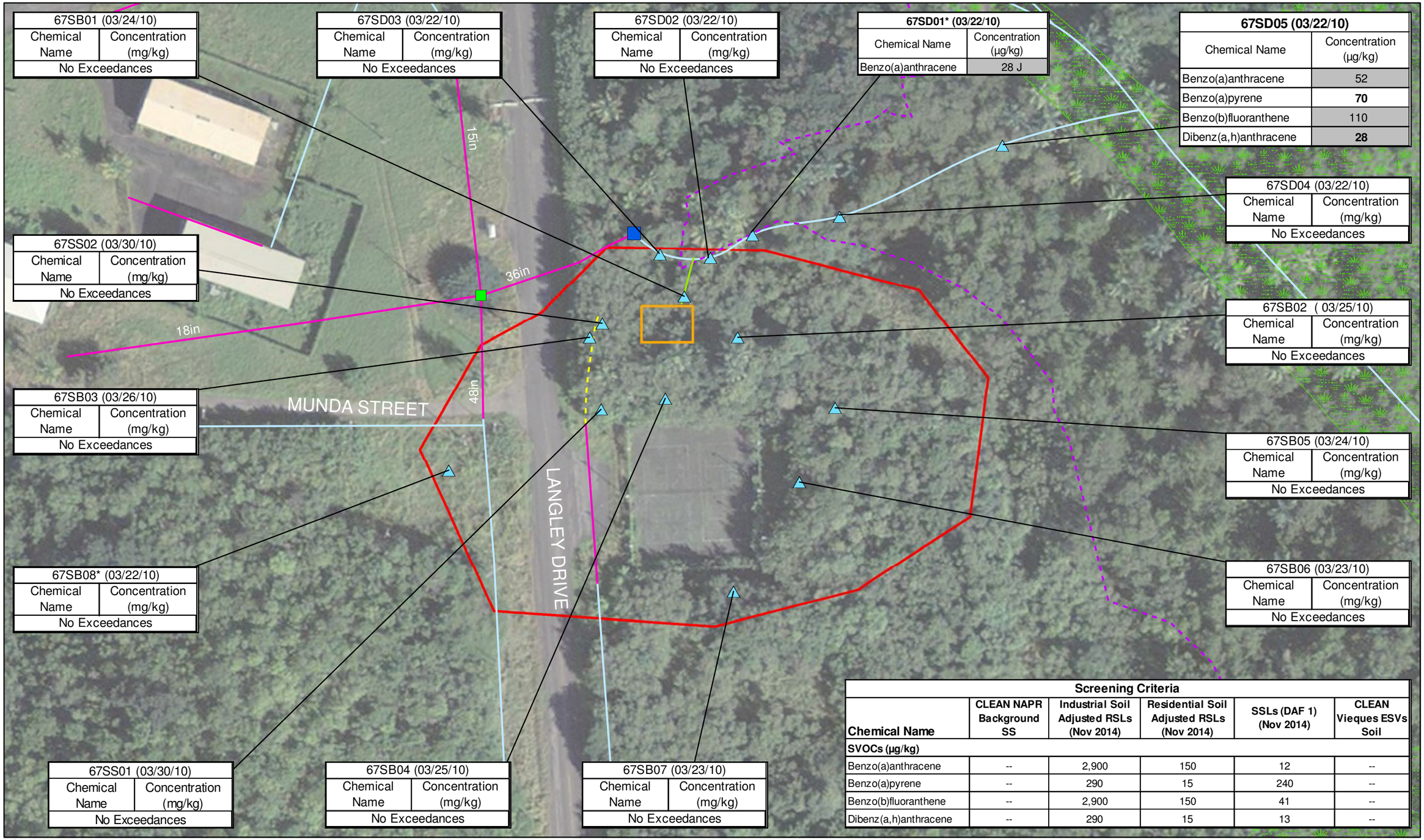
$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0363	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (terrestrial plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (small mammals, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (small mammals)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
WIR =	0.0642	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	1.134	= Body weight (kg)



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
SWMU 67 Revised Phase I RFI
Naval Activity Puerto Rico



67SB01 (03/24/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SD03 (03/22/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SD02 (03/22/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SD01* (03/22/10)

Chemical Name	Concentration (µg/kg)
Benzo(a)anthracene	28 J

67SD05 (03/22/10)

Chemical Name	Concentration (µg/kg)
Benzo(a)anthracene	52
Benzo(a)pyrene	**70**
Benzo(b)fluoranthene	110
Dibenz(a,h)anthracene	**28**

67SD04 (03/22/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SS02 (03/30/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB02 (03/25/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB03 (03/26/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB05 (03/24/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB06 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB08* (03/22/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SS01 (03/30/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB04 (03/25/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB07 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

Screening Criteria

Chemical Name	CLEAN NAPR Background SS	Industrial Soil Adjusted RSLs (Nov 2014)	Residential Soil Adjusted RSLs (Nov 2014)	SSLs (DAF 1) (Nov 2014)	CLEAN Vieques ESVs Soil
SVOCs (µg/kg)					
Benzo(a)anthracene	--	2,900	150	12	--
Benzo(a)pyrene	--	290	15	240	--
Benzo(b)fluoranthene	--	2,900	150	41	--
Dibenz(a,h)anthracene	--	290	15	13	--

Phase I RFI Surface Soil Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

Notes:
Bold box indicates exceedance of NAPR Background SS.
Underline indicates exceedance of RSLs Industrial Soil Adjusted.
Bold text indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
Red text indicates exceedance of Vieques ESVs Soil.

1. RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
2. SSLs are Risk-Based if there is no MCL-Based value.
J - Analyte present, value may or may not be accurate or precise
µg/kg - Micrograms per kilogram
SVOCs - semivolatile organic compounds

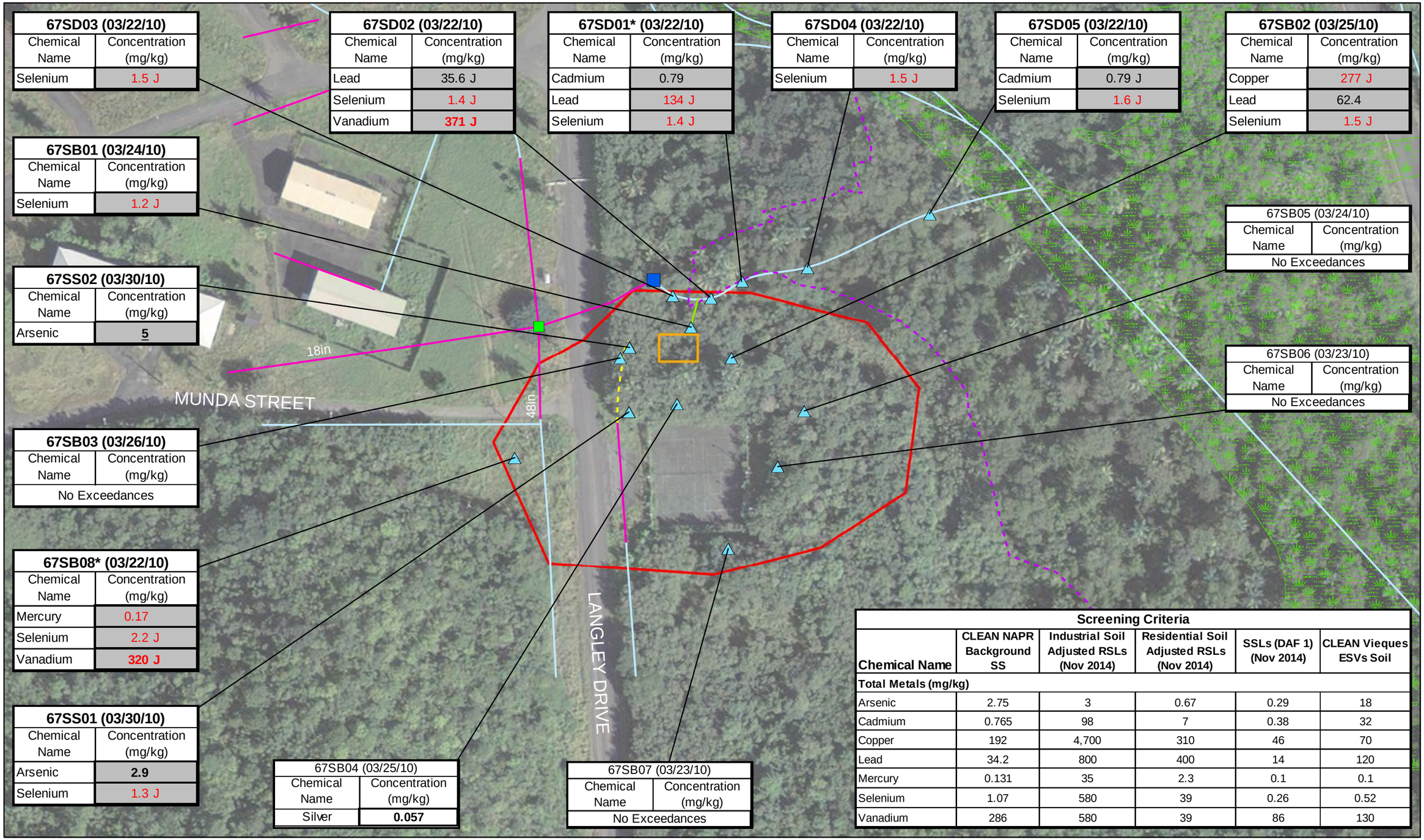
N
0 75 Feet
1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 5-2
Surface Soil Exceedances of Screening Criteria - Organic Compounds
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL

DVR \\MANAGED.LOCAL\CRITIGEN\PROJECTS\USNAVYPUERTORICO_SWMU67_20000819\MAPFILES\SWMU 67 PHASE I RFI\FIGURE 5-2 - SURFACE SOIL EXCEEDANCES OF SCREENING CRITERIA - ORGANIC COMPOUNDS.MXD JCARR_CH2MHILLENVGIS 3/5/2015 7:51:41 AM



67SD03 (03/22/10)

Chemical Name	Concentration (mg/kg)
Selenium	1.5 J

67SD02 (03/22/10)

Chemical Name	Concentration (mg/kg)
Lead	35.6 J
Selenium	1.4 J
Vanadium	**371 J**

67SD01* (03/22/10)

Chemical Name	Concentration (mg/kg)
Cadmium	0.79
Lead	134 J
Selenium	1.4 J

67SD04 (03/22/10)

Chemical Name	Concentration (mg/kg)
Selenium	1.5 J

67SD05 (03/22/10)

Chemical Name	Concentration (mg/kg)
Cadmium	0.79 J
Selenium	1.6 J

67SB02 (03/25/10)

Chemical Name	Concentration (mg/kg)
Copper	277 J
Lead	62.4
Selenium	1.5 J

67SB01 (03/24/10)

Chemical Name	Concentration (mg/kg)
Selenium	1.2 J

67SS02 (03/30/10)

Chemical Name	Concentration (mg/kg)
Arsenic	**5**

67SB05 (03/24/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB06 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB03 (03/26/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB08* (03/22/10)

Chemical Name	Concentration (mg/kg)
Mercury	0.17
Selenium	2.2 J
Vanadium	**320 J**

67SS01 (03/30/10)

Chemical Name	Concentration (mg/kg)
Arsenic	**2.9**
Selenium	1.3 J

67SB04 (03/25/10)

Chemical Name	Concentration (mg/kg)
Silver	**0.057**

67SB07 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

Screening Criteria

Chemical Name	CLEAN NAPR Background SS	Industrial Soil Adjusted RSLs (Nov 2014)	Residential Soil Adjusted RSLs (Nov 2014)	SSLs (DAF 1) (Nov 2014)	CLEAN Vieques ESVs Soil
Total Metals (mg/kg)					
Arsenic	2.75	3	0.67	0.29	18
Cadmium	0.765	98	7	0.38	32
Copper	192	4,700	310	46	70
Lead	34.2	800	400	14	120
Mercury	0.131	35	2.3	0.1	0.1
Selenium	1.07	580	39	0.26	0.52
Vanadium	286	580	39	86	130

Phase I RFI Surface Soil Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

Notes:
Bold box indicates exceedance of NAPR Background SS.
Underline indicates exceedance of RSLs Industrial Soil Adjusted.
Bold text indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1
Red text indicates exceedance of Vieques ESVs Soil.

1. RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
2. SSLs are Risk-Based if there is no MCL-Based value.
3. Exceedances for inorganic constituents are presented only if it exceeded the background value and one or more additional screening criteria.
J - Analyte present, value may or may not be accurate or precise
mg/kg - Milligrams per kilogram

N
0 100 Feet
1 inch = 100 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 5-3
Surface Soil Exceedances of Screening Criteria - Inorganic Compounds
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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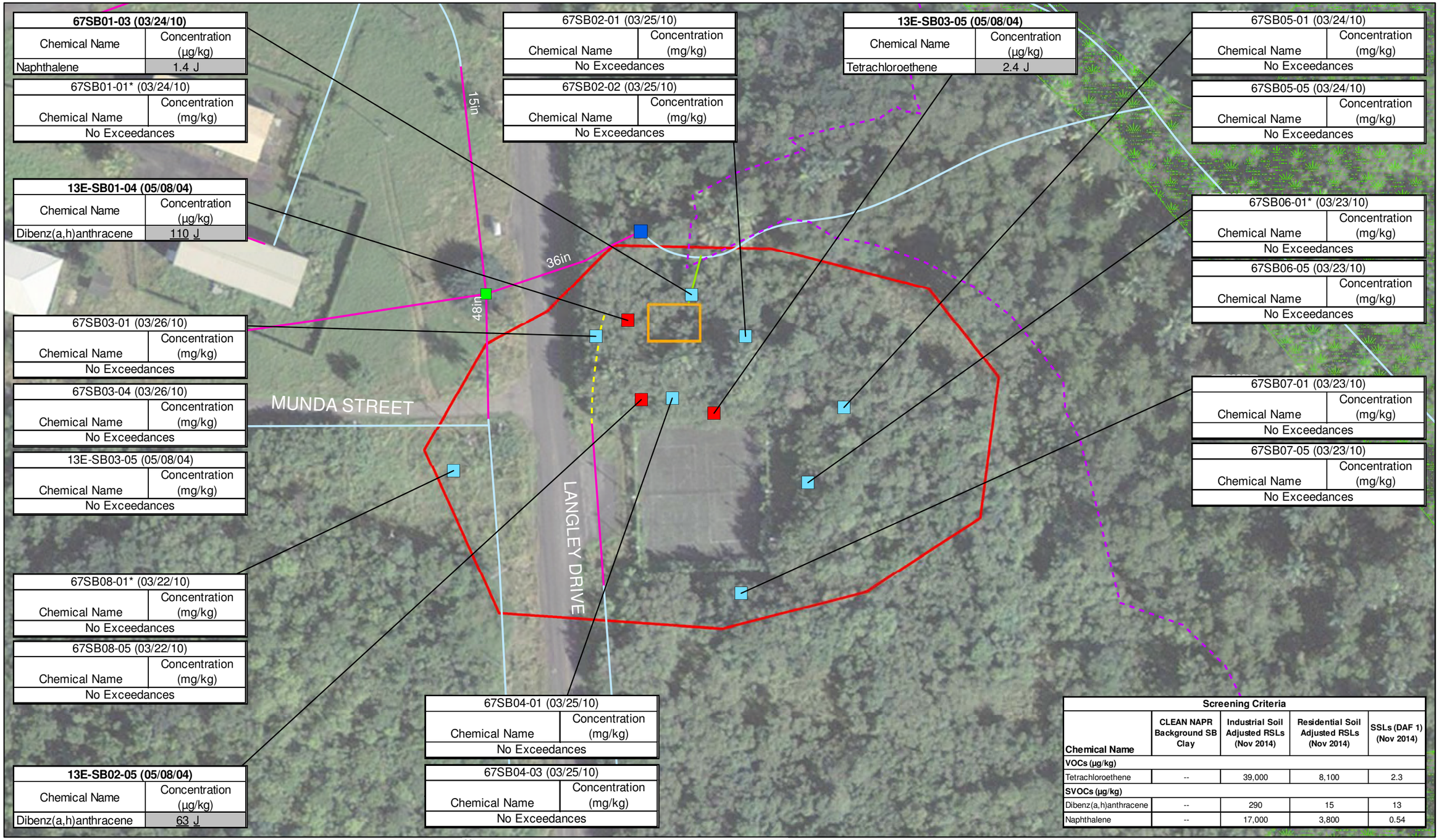

67SB01-03 (03/24/10)	
Chemical Name	Concentration (µg/kg)
Naphthalene	1.4 J

67SB01-01* (03/24/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-SB01-04 (05/08/04)	
Chemical Name	Concentration (µg/kg)
Dibenz(a,h)anthracene	110 J

67SB03-01 (03/26/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB03-04 (03/26/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-SB03-05 (05/08/04)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB08-01* (03/22/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB08-05 (03/22/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-SB02-05 (05/08/04)	
Chemical Name	Concentration (µg/kg)
Dibenz(a,h)anthracene	63 J

67SB02-01 (03/25/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB02-02 (03/25/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB04-01 (03/25/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB04-03 (03/25/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-SB03-05 (05/08/04)	
Chemical Name	Concentration (µg/kg)
Tetrachloroethene	2.4 J

67SB05-01 (03/24/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB05-05 (03/24/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB06-01* (03/23/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB06-05 (03/23/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB07-01 (03/23/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB07-05 (03/23/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

Screening Criteria				
Chemical Name	CLEAN NAPR Background SB Clay	Industrial Soil Adjusted RSLs (Nov 2014)	Residential Soil Adjusted RSLs (Nov 2014)	SSLs (DAF 1) (Nov 2014)
VOCs (µg/kg)				
Tetrachloroethene	--	39,000	8,100	2.3
SVOCs (µg/kg)				
Dibenz(a,h)anthracene	--	290	15	13
Naphthalene	--	17,000	3,800	0.54

ECP Subsurface Soil Sample Location
Phase I RFI Soil and Groundwater Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

Notes:

Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1

1. RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
2. SSLs are Risk-Based if there is no MCL-Based value.
J - Analyte present, value may or may not be accurate or precise
µg/kg - Micrograms per kilogram
VOCs - volatile organic compounds
SVOCs - semivolatile organic compounds

N

0 75 Feet
1 inch = 75 feet

FIGURE 5-4
Subsurface Soil Exceedances of Screening Criteria - Organic Compounds
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

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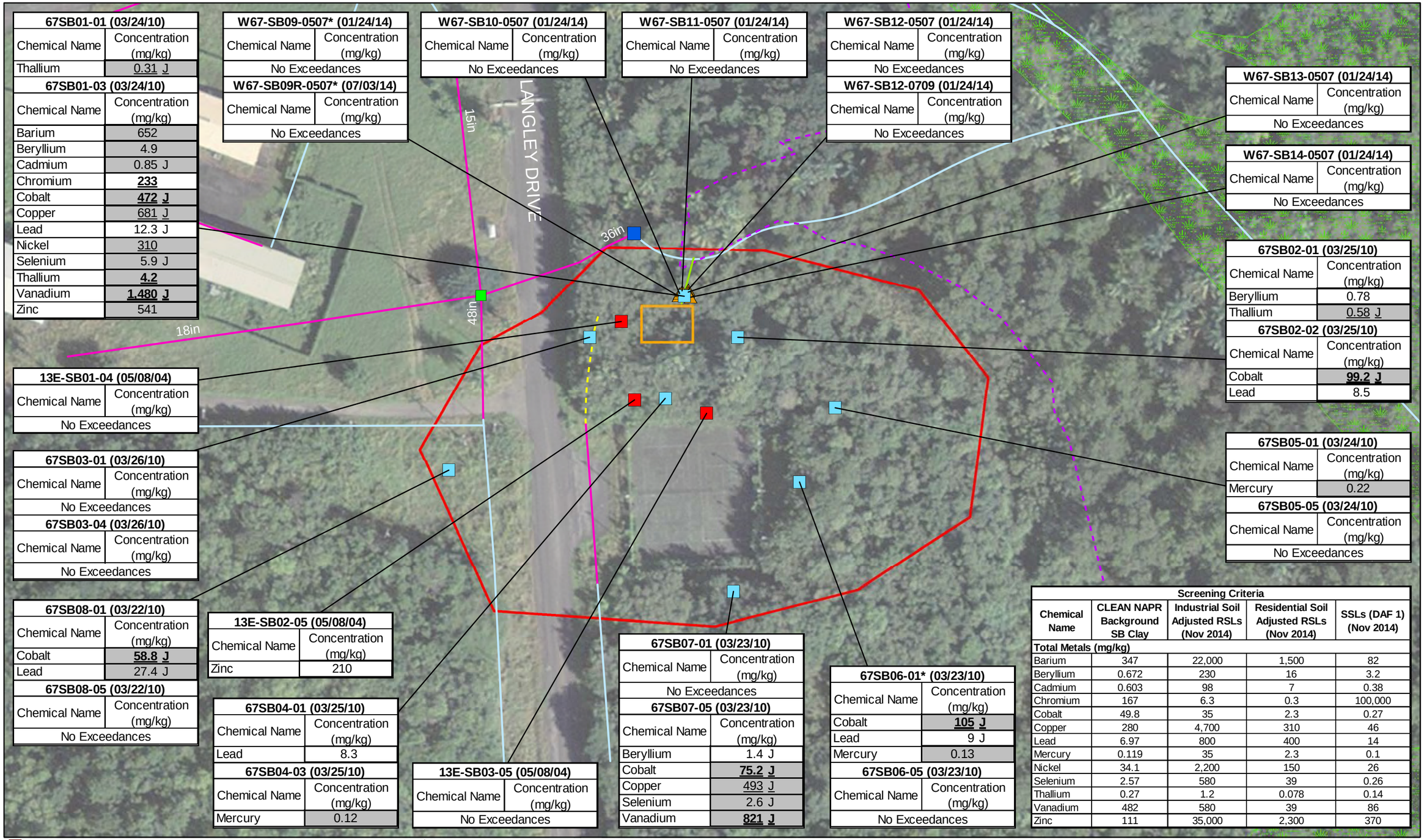

67SB01-01 (03/24/10)

Chemical Name	Concentration (mg/kg)
Thallium	0.31 J

67SB01-03 (03/24/10)

Chemical Name	Concentration (mg/kg)
Barium	652
Beryllium	4.9
Cadmium	0.85 J
Chromium	**233**
Cobalt	**472 J**
Copper	681 J
Lead	12.3 J
Nickel	310
Selenium	5.9 J
Thallium	**4.2**
Vanadium	**1,480 J**
Zinc	541

W67-SB09-0507* (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB09R-0507* (07/03/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB10-0507 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB11-0507 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB12-0507 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB12-0709 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB13-0507 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

W67-SB14-0507 (01/24/14)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB02-01 (03/25/10)

Chemical Name	Concentration (mg/kg)
Beryllium	0.78
Thallium	0.58 J

67SB02-02 (03/25/10)

Chemical Name	Concentration (mg/kg)
Cobalt	**99.2 J**
Lead	8.5

13E-SB01-04 (05/08/04)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB05-01 (03/24/10)

Chemical Name	Concentration (mg/kg)
Mercury	0.22

67SB05-05 (03/24/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB03-01 (03/26/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB03-04 (03/26/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB08-01 (03/22/10)

Chemical Name	Concentration (mg/kg)
Cobalt	**58.8 J**
Lead	27.4 J

67SB08-05 (03/22/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-SB02-05 (05/08/04)

Chemical Name	Concentration (mg/kg)
Zinc	210

67SB04-01 (03/25/10)

Chemical Name	Concentration (mg/kg)
Lead	8.3

67SB04-03 (03/25/10)

Chemical Name	Concentration (mg/kg)
Mercury	0.12

13E-SB03-05 (05/08/04)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB07-01 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

67SB07-05 (03/23/10)

Chemical Name	Concentration (mg/kg)
Beryllium	1.4 J
Cobalt	**75.2 J**
Copper	493 J
Selenium	2.6 J
Vanadium	**821 J**

67SB06-01* (03/23/10)

Chemical Name	Concentration (mg/kg)
Cobalt	**105 J**
Lead	9 J
Mercury	0.13

67SB06-05 (03/23/10)

Chemical Name	Concentration (mg/kg)
No Exceedances	

Screening Criteria

Chemical Name	CLEAN NAPR Background SB Clay	Industrial Soil Adjusted RSLs (Nov 2014)	Residential Soil Adjusted RSLs (Nov 2014)	SSLs (DAF 1) (Nov 2014)
Total Metals (mg/kg)				
Barium	347	22,000	1,500	82
Beryllium	0.672	230	16	3.2
Cadmium	0.603	98	7	0.38
Chromium	167	6.3	0.3	100,000
Cobalt	49.8	35	2.3	0.27
Copper	280	4,700	310	46
Lead	6.97	800	400	14
Mercury	0.119	35	2.3	0.1
Nickel	34.1	2,200	150	26
Selenium	2.57	580	39	0.26
Thallium	0.27	1.2	0.078	0.14
Vanadium	482	580	39	86
Zinc	111	35,000	2,300	370

ECP Subsurface Soil Sample Location
Phase I RFI Subsurface Soil Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP
Additional Phase I RFI Subsurface Soil Sample Location

Notes:
Bold box indicates exceedance of NAPR Background SB Clay.
Bold text indicates exceedance of RSLs Industrial Soil Adjusted.
Underline indicates exceedance of RSLs Residential Soil Adjusted.
Grey shading indicates exceedance of SSLs at a DAF of 1

1. RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
2. SSLs are Risk-Based if there is no MCL-Based value.
3. Exceedances for inorganic constituents are presented only if it exceeded the background value and one or more additional screening criteria.

J - Analyte present, value may or may not be accurate or precise
mg/kg - Milligrams per kilogram

N
0 75 Feet
1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 5-5
Suburface Soil Exceedances of Screening Criteria - Inorganic Compounds
SWMU 67 - Former Gas Station
Phase I RFI
Naval Activity Puerto Rico

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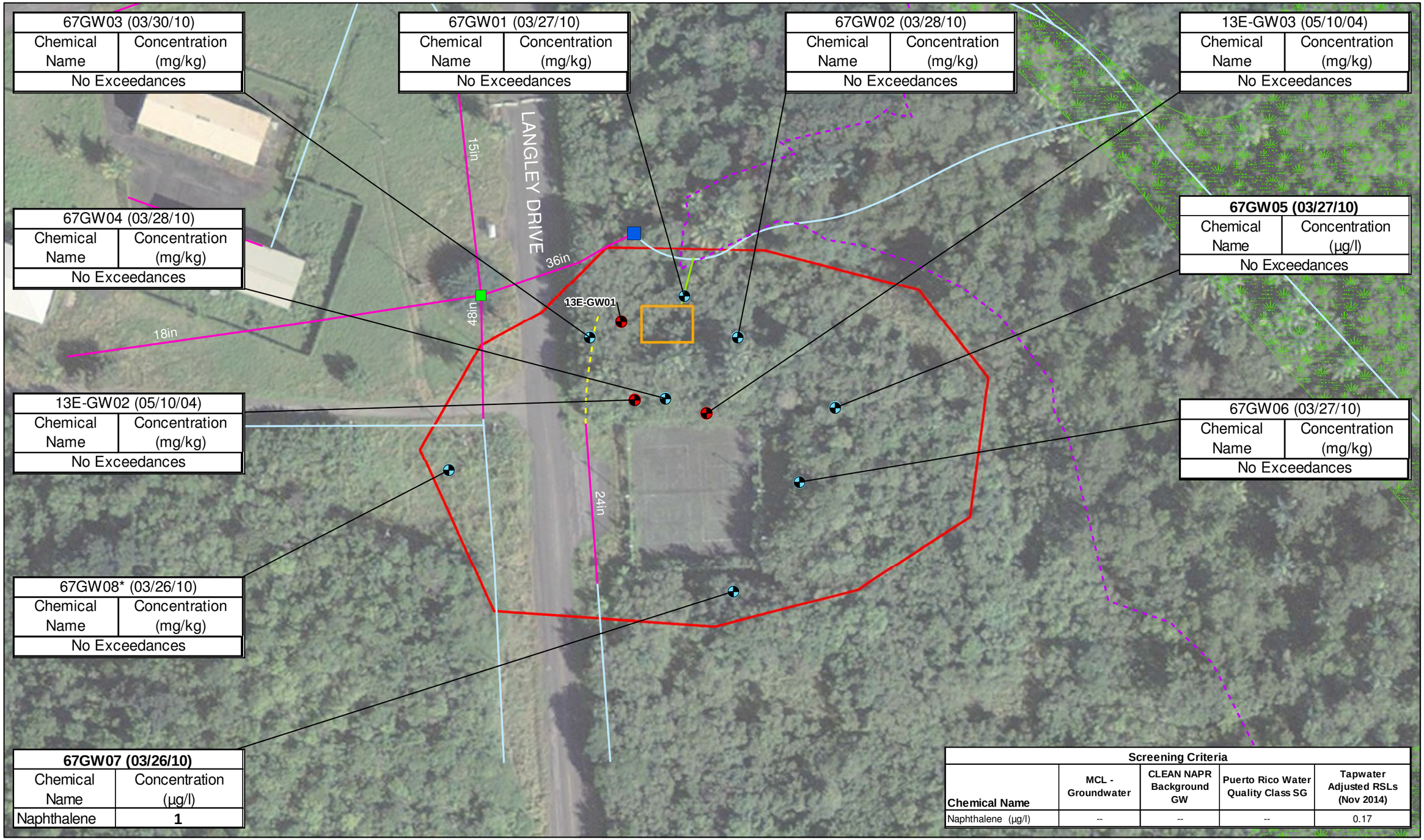

67GW03 (03/30/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW01 (03/27/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW02 (03/28/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

13E-GW03 (05/10/04)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW04 (03/28/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW05 (03/27/10)	
Chemical Name	Concentration (µg/l)
No Exceedances	

13E-GW02 (05/10/04)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW06 (03/27/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW08* (03/26/10)	
Chemical Name	Concentration (mg/kg)
No Exceedances	

67GW07 (03/26/10)	
Chemical Name	Concentration (µg/l)
Naphthalene	**1**

Screening Criteria				
Chemical Name	**MCL - Groundwater**	**CLEAN NAPR Background GW**	**Puerto Rico Water Quality Class SG**	**Tapwater Adjusted RSLs (Nov 2014)**
Naphthalene (µg/l)	--	--	--	0.17

ECP Groundwater Sample Location
Phase I RFI Soil and Groundwater Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

Notes:
Grey shading indicates exceedance of MCL-Groundwater.
Bold box indicates exceedance of NAPR Backgound GW.
Underline indicates exceedance of PRWQ Class SG.
Bold text indicates exceedance of RSLs Tap Water Adjusted.
RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
µg/l - Micrograms per liter

N
0 75 Feet
1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 5-6
Groundwater Exceedances of Screening Criteria - Organic Compounds
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL

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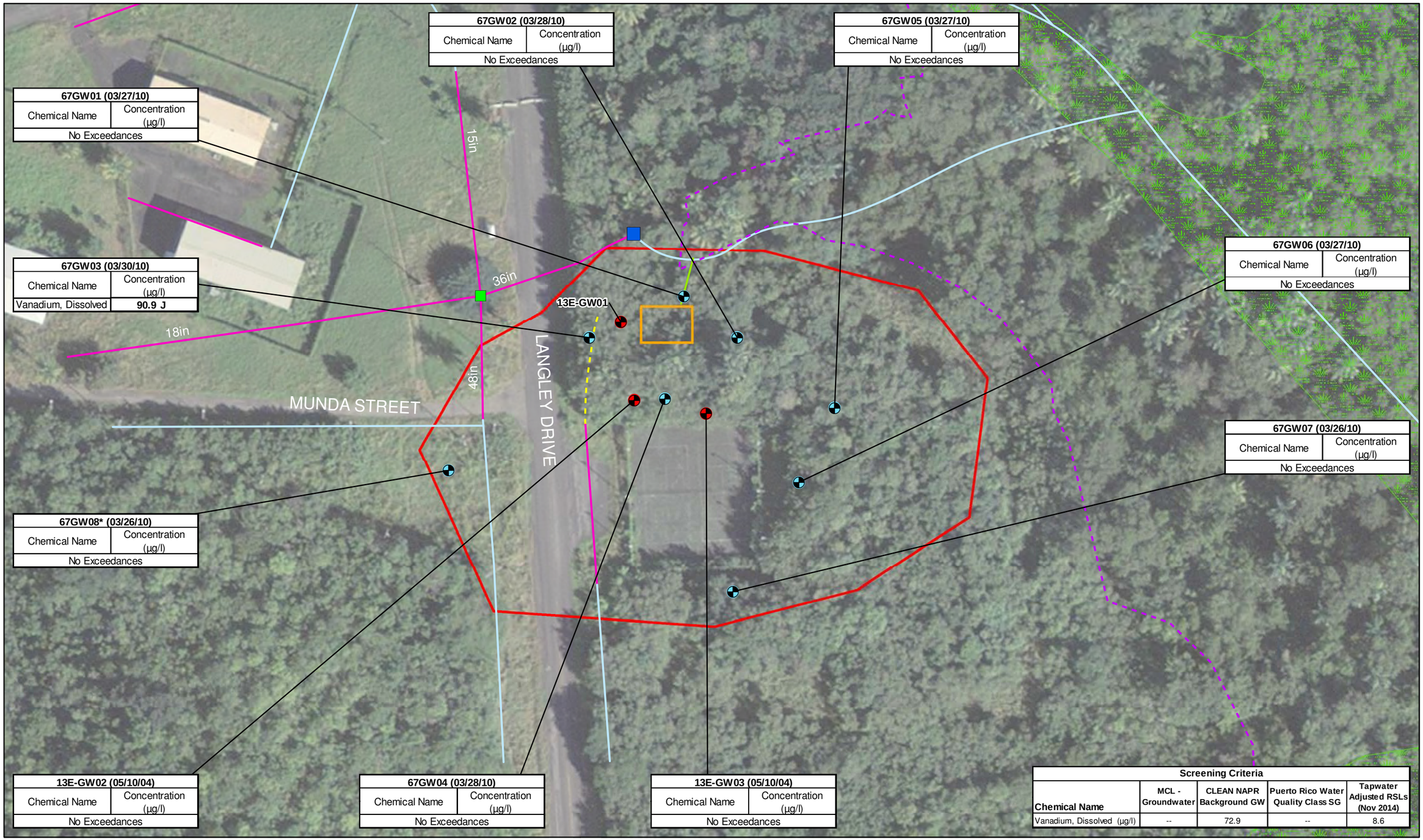

Screening Criteria				
Chemical Name	MCL - Groundwater	CLEAN NAPR Background GW	Puerto Rico Water Quality Class SG	Tapwater Adjusted RSLs (Nov 2014)
Vanadium, Dissolved (µg/l)	--	72.9	--	8.6

ECP Groundwater Sample Location
Phase I RFI Groundwater Sample Location
Inlet
Culvert
Earthen Drainage Feature
Approximate Location of 8" Maintenance Pit Drainage Pipe
2010 Field Delineated Wetland Boundary
Ditch/Swale
Storm Sewer Line
Esturine Wetland
Potential Former Gas Station Building
SWMU 67 Boundary as Defined in Phase I ECP

Notes:
Grey shading indicates exceedance of MCL-Groundwater.
Bold box indicates exceedance of NAPR Backgound GW.
Underline indicates exceedance of PRWQ Class SG.
Bold text indicates exceedance of RSLs Tap Water Adjusted.
1. RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents
2. Exceedances for inorganic constituents are presented only if it exceeded the background value and one or more additional screening criteria.
µg/l - Micrograms per liter

N
0 75 Feet
1 inch = 75 feet

Aerial Imagery Source:
Esri/UPR-RP
Imagery Date: January 15, 2010

FIGURE 5-7
Groundwater Exceedances of Screening Criteria - Inorganic Compounds
SWMU 67 - Former Gas Station
Revised Phase I RFI
Naval Activity Puerto Rico

CH2MHILL

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SECTION 6

Conclusions and Recommendations

6.1 Conclusions

The following conclusions have been formulated from information gathered as part of the Revised Phase I RFI.

- The boundary of SMWU 67 as defined in the ECP overestimates the potential SWMU area (i.e., possible gas station area/vehicle maintenance shop associated with the former building foundation and potential maintenance pit). The tennis court area and areas west of Langley Drive would, therefore, not be associated with the SWMU, which is further supported by the data collected as part of the Phase I RFI. While the presence of a concrete pad/building foundation and an 8-ft deep, rectangular concrete pit may indicate the remnants of a potential gas station/vehicle maintenance shop, no evidence of a fuel storage tank has been discovered during records searches and interviews (LANTDIV, 2004), or during the geophysical survey performed in January 2014, and the petroleum-related constituent data collected at the site do not indicate the past presence of fuel storage tanks. The most prevalent inorganics are localized in one subsurface soil sample in the vicinity of the concrete pad/pit.
- Potential ecological risks are acceptable and ELCR and non-cancer hazards associated with industrial land use of soil are within USEPA acceptable levels. Potentially unacceptable human health risks were identified under the conservative residential land use scenario for soil and potable use of site groundwater. However:
  - The constituents contributing to potentially unacceptable risk for residential soil exposure (thallium, cobalt, and vanadium) are not likely attributable to a site-related release.
  - The constituents contributing to unacceptable risk for potable use of site groundwater are not likely attributable to a site-related release. None of the detections exceeded MCLs, and all of the inorganics are attributable to background (BTVs), except one detected concentration of dissolved vanadium. Therefore, the potable use concern is not site-related. The 2011 Environmental Assessment of NAPR, conducted in support of the Land Reuse Plan (LRA, 2010), concluded that the groundwater within NAPR is 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).
- The evaluation of soil and groundwater data indicate leaching to groundwater is not a concern (i.e., concentrations in groundwater are either below MCLs, below tap-water RSLs, or attributable to background).

6.2 Recommendation

The results of investigations and risk evaluations performed on soil and groundwater data from SWMU 67 indicate no unacceptable human health or ecological risks beyond those attributable to background that are associated with exposure to site soil or groundwater, nor are there exceedances of any other potentially relevant criteria (such as MCLs). Based on the results of this Revised Phase I RFI, no additional investigation or corrective action is warranted. Further, no restrictions for the future use of the site are recommended for SWMU 67.

SECTION 7

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Appendix A
Field Investigation Information

SITE PHOTOGRAPHS AND PHOTOGRAPH LOCATION MAP

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

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

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

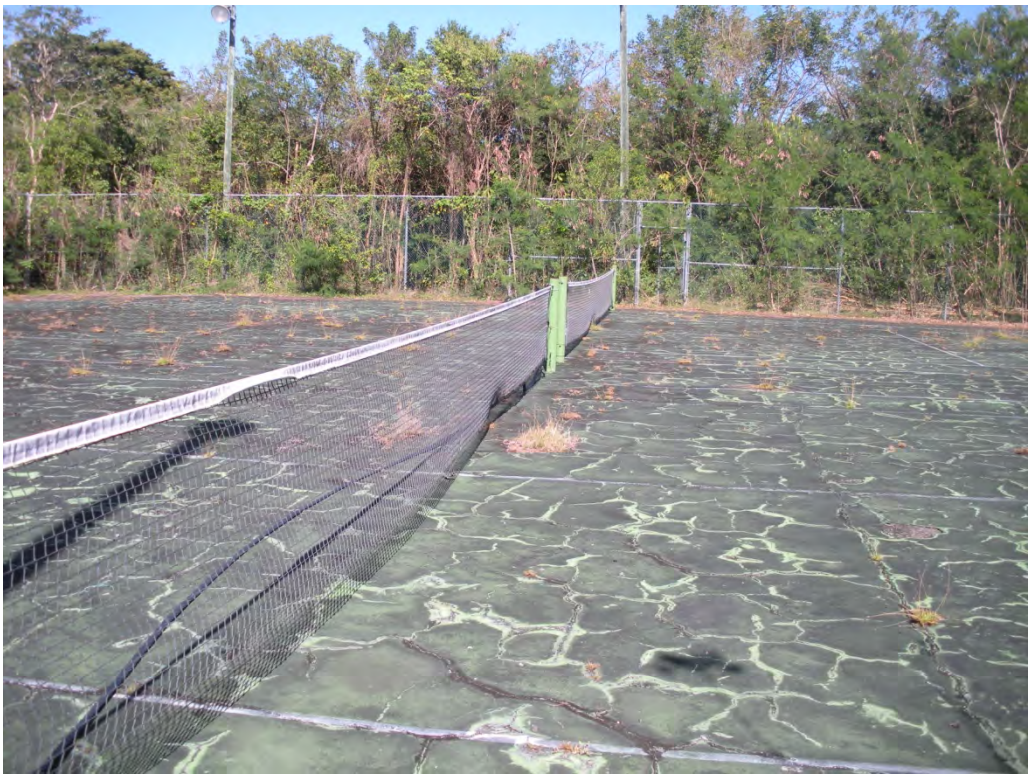


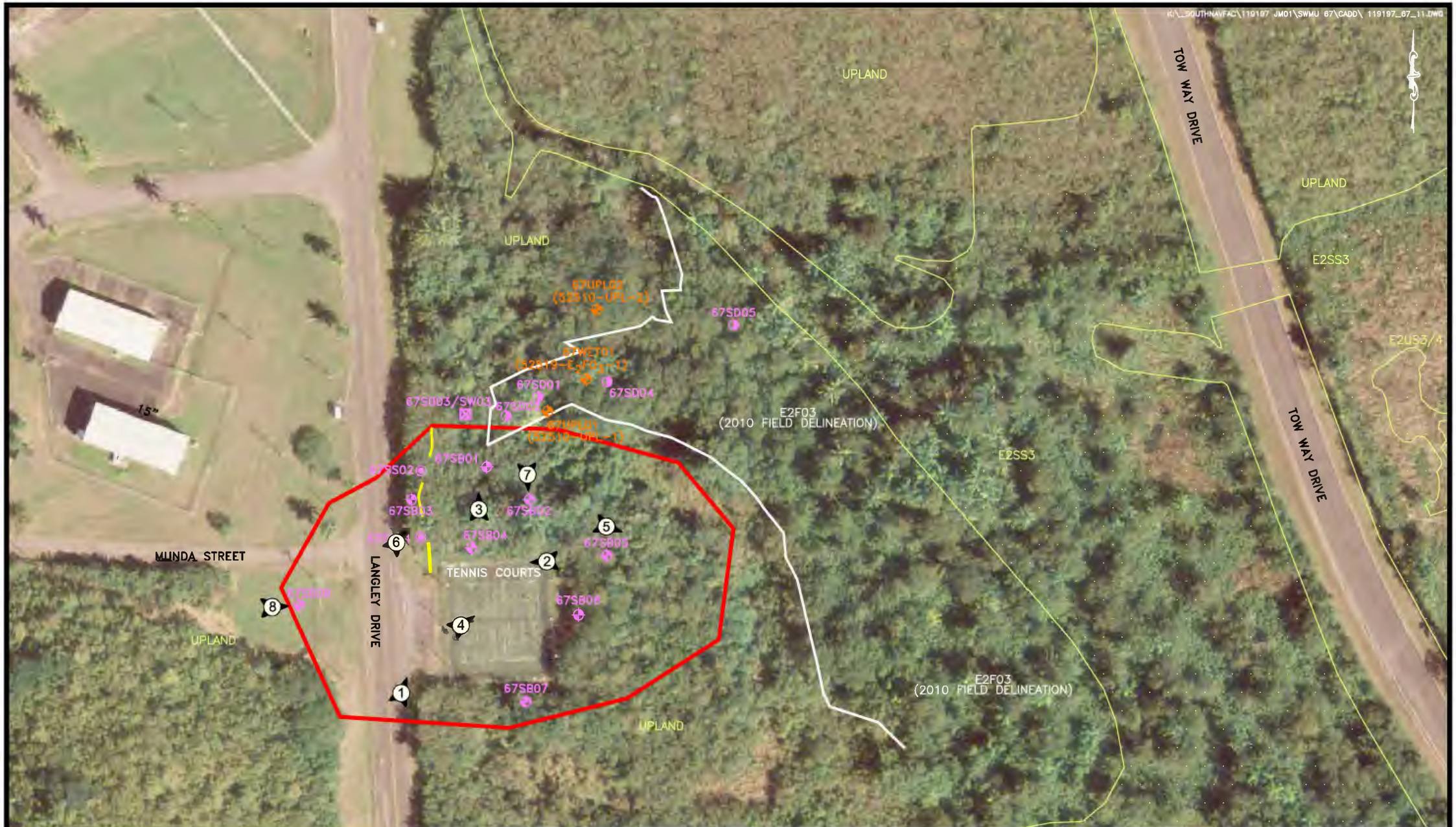
Photo #4. SWMU 67 and tennis court area - view looking east-northeast

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

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

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

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



100 0 50 100

1 inch = 100 ft.

SOURCE: USGS, NOV, 2006.

Baker

LEGEND

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

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

NAVAL ACTIVITY PUERTO RICO

FIELD LOG BOOK NOTES

Environmental Scientist – Adam Gailey

Sunday March 21, 2010
SWMU 67 PhaseI RFI

0715 - Depart PIT for SJU.

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

1630 - Depart NAPR

APG

Monday March 22, 2010

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

0820 - Arrive at SWMU 67. GPS / Navigate to Proposed Soil Boring locations.

NOTE: where surface soil samples are located in a forested wetland area. Saturated sediment and Hydrophytes throughout. Hydrology to this area is conveyed through a large Culvert. Vegetation includes Golden Leather fern, Black Mangrove, and PR. Palm. Additional information will be gathered later.

1015 - Meet with Drivers GEO EnviroTech.

3-22-10

1115 - Break for lunch.

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

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

3-22-10

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

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

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

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

3-22-10

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

1610 - Back at Security to label bottles.

1730 - Depart NAPR

ADC

Tuesday March 23, 2010

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

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

Break for Lunch - 1130.

1215 - Meet with RWEC for site clearing.

1230 - Begin site clearing at SWMU 67.

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

1515 - Recon at SWMU 60.

1700 - Depart NAPR.

ADC

Wednesday March 24, 2010

0650 - Arrive at UAPR.
Organize and manage samples from (re-ice, etc.).

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

Assist with SWMU 3 - Semi Annual Landfill Sampling:

Perform Daily Decon on bladder pump.

YSI Meter Calibration: S/N 01D0692C

		Initial	Adjusted
pH buffer	4	3.97	4.00
	7	7.98	7.00
	10	10.04	10.00
ORP		243	251
SP Cond		1.362	1.409
DO		8.69	8.23
Temp		25.23	—

APC

3-24-10

(HI98703)

Hama Turbidimeter:

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

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

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

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

APC

3-24-10

Earthern Drainage Feature:
Drainage Feature on-site Conveys Roadway Runoff downgradient of SWMU 67. The feature is dry with No hydrophytes and dissipates downgradient. It does not appear that after Site Recon that this feature Conveys flow to the Pto Wetland. Vegetation species in the earthen Drainage feature are upland in Nature.

1700 - DePart NAPR

APG

Thursday March 25, 2010

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

1450 - Prep for Landfill Gas monitoring. GEM 500 Landfill Gas Meter was Calibrated earlier - See D. Hupe Logbook Notes.

PID meter Calibration Conducted earlier Also - See R. Rosecins Logbook.

1520 - Arrive at Landfill for Gas Monitoring:

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

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

Friday March 26, 2010

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

1110 - Break for lunch.

1225 - Finish Fedex Shipment prep.

1645 - Fedex arrives.

1715 - Depart NAPR.

APG

SATurday March 27, 2010

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

0805 - Arrive at 67GW06.
Prep for Purge and Sampling. See ground water sample sheets and R. Roselius Notebook for additional information.

0940 - sample time

1035 - Sample Complete

1043 - Refuel Rental Vehicle at Base Marina.

1108 - Arrive at SWMU 67.

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

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

1210 - Break for Lunch.

3-27-10

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

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

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

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

1615 - Depart NAPR

AFV

Sunday March 28, 2010

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

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

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

Perform between well decon on 2 bladder pumps.

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

3-28-10

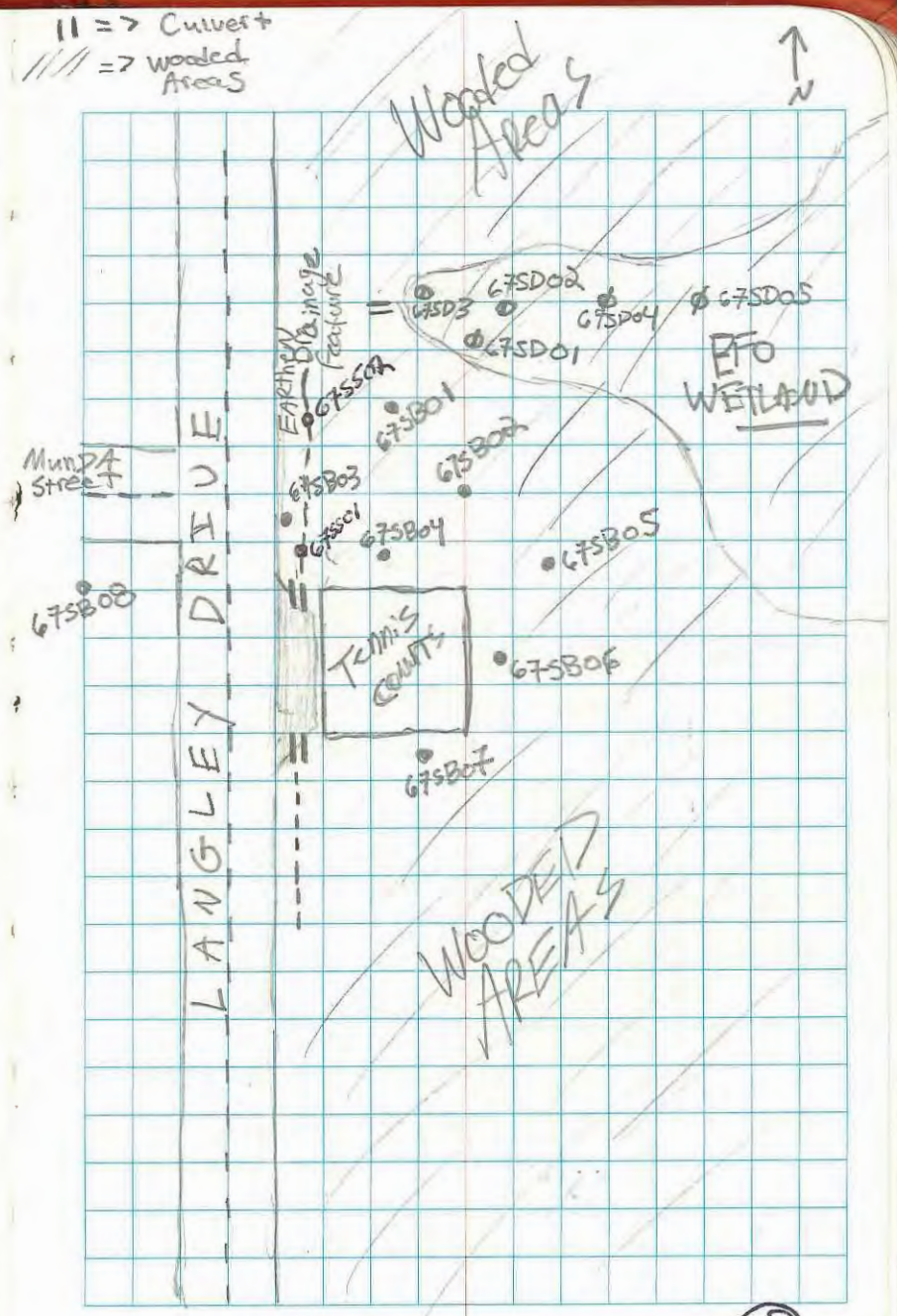
1110 - Break for lunch.
Prep for Next well.

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

Sample Time: 1320

1415 - Depart NAPR.

ATG



3-29-10 12:07

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

Time	Well ID	SWL
1405	17GW04R	12.07
1410	17GW09	9.79
1415	17GW02R	5.02
1417	17GW01R	7.31
1423	17GW03R	14.28
1426	17GW10	13.40
1428	17GW07R	14.88
1431	17GW08R	10.83
1440	17GW11	7.88

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

1645 - Depart NAPR

ADG

Tuesday March 30, 2010

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

0720 - Surveyors arrive. Meeting to discuss Surveying Approach.

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

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

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

ADG

3-30-10

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

3 x 40 ml vials (VOC)
1 8oz. Jar (SVOC)
1 4oz. Jar (G-RO)
1 2oz. Jar (METALS)

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

" " same glassware and Analysis for 67SS02

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

3-30-10

1000 - Assist with 67GW03 Purge and Sample.

1110 - Back at security and lunch.

1205 - Collect 67IDW01 (Soil Composite.)

1215 - Collect 67IDW02 (Aqueous)

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

Depart MAPR 1445

ADG

Wednesday March 31, 2010

0645 - Arrive at NAPR. Pack Equipment and Supplies.

0830 - Water Levels at SWMU 75.

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

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

1035 - GPS 67SS01 and 67SS02

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

1140 - Break for Lunch Finishing Equipment Pack for Fedex.

3-31-10

1315 - GPS Work at SWMU 2.

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

1445 - Depart NAPR.

APK

5-24-10

- Back To Security to Pack Equipment and Samples.

1530 - Fedex arrives.

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

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

1700 - Depart UMPR

MDa

Tuesday May 25, 2010

0705 - Arrive at UMPR.

0730 - Surveyors arrive on site - Felix and George.

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

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

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

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

Environmental Geologist – Robert Roselius

Sun. 3/21/10 SWMU 67

MOBE - ROSELINS, GAILEY, & HUPE
DEPART PITT. 0715 EDT, PRONG.
SAN JUAN 1320 EDT @ NAPR 1515,
PREP / BOTTLE / CHARGE / ORG. DEPART.
1630 DEPART

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

▲ 67 GROSSLARGE
APPX VOCS = 2 DI H2O / 1 MeOH.
" SVOCS & DRO = 1 8 oz JAR.
TPH GRO = 1 4 oz.
" METALS = 1 2 oz

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

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

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

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

1320 DRILLER SET UP AND BEGIN @
RER 4/11/11 — 57SB08
— 57SB08 — (PID BKL 0.0)

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

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

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

67SB08 (CONT) 12-15.5

12-16 SPA w/ IRON/RUST STAINING
3.2 Damp to MOIST?
BKG

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

EVAL SITE CONDITIONS, REVIEW LOGS.
WILL BUILD WELL W/ 20' TD.
1540 COMPLETE 67GW08

• 67GW08 •
TD 20' bgs
SCREEN 10-20' bgs
SAND to 7' bgs
BENTONITE to 4.5' bgs

EVALUATE ROUTE/CLEARING TO
67SB07 - DRILLERS TO CLEAR/
SETUP @ 67SB07 & DECON.
1615 HEAD TO OFFICE TO MANAGE
SAMPLES ETC.
1700 DRILLERS DEPART.
1730 DEPART MAPR

TUES (3/23/10)

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

0730 @ 67 DRILLER ARRIVES ALSO.
PREP to SAMPLE 67SB07. - WORK
ON CHAIN SAW, CHAIN OFF, TO CUT TO
GET TO SPECIFIC LOCATION
0755 BEGIN 67SB07

- 67SB07 - (PID BKG - 0.0)

0-4 0-0.3 TOPSOIL, ORGANICS.
3.2
BKG 0.3-3.5 CLAY to FINE SAND, SOME
COARSE SAND & COARSE GRAVEL (1.7-2.0)
67SB07-00 w/ SOME GRAVEL THROUGHOUT
@ 0805 DRY to DAMP, NON PLASTIC,
LOOSE. (FILL)
67SB07-01 3.5-4.0 FINE SAND, SOME COARSE
@ 0810 SAND, PINK/WHITE, DRY to DAMP.
NON PLASTIC, LOOSE (FILL)

4-8 4-4.4 CLAY w/ SILT to COARSE SAND, BR, OR
4.0 GREY. DAMP, SLIGHT PLASTICITY,
BKG STIFF.
4.4-8.0 CLAY, SOME SILT, ORANGE BR. W/
SOME LT GREY, RUST, OR BLK MOTTLES, MED
PLASTICITY, MED STIFF.

67SB07 (CONT.)

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

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

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

1020 COMPLETE AUGERING @ 67SB07
MOIST CUTTINGS, LIKELY LOW YIELD
WELL
1030 COLLECT 67FB01 USING LAB
GRADE DI WATER.

1045 COLLECT 67VEROZ FROM NEW
DPT LINER.

1100 COMPLETE CONSTRUCTING 67GW07

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

1120 SET UP/MOVE/CLEAR @ 67SB
(FRANKIE)
1215 RIGHT WAY ONSITE, DISCUSS
CUBPRINT - DRILLER DOWN/PREP.
1335 DRILLING @ 67SB06

— SEE NEXT PAGE —

— 67SB06 — (PID BKG 0.0)

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

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

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

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

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

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

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

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

WED. 3/24/16

15.68
3.5.

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

0725 @ 67 PREP FOR SWLS USE INTERFACE PROBE

0730 67GW08 SWL 15.68 TOC

~~0739~~ APPROX TEMP STICKUP 3.5

(WILL BE CUT WHEN COMPLETED AT SURFACE) 12.18 bgs

~~0739~~ 67GW07 SWL 15.44

0739 APPROX TEMP STICKUP 3.40

12.04

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

67GW06 SWL 12.00' TOC

APPROX STICKUP TEMP 2.00

10.00' bgs

0805 DRIVER BOOM SAMPLING @ 67SB05

-67SB05 - (PID BKG @ 0)

0-4 0-0.2 TOPSOIL

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

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

1.5-2.0 BEACH SAND, SHELL, & CORAL

67SB05-00 (VARIGATED) PINKISH WHITE.

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

67SB05-01 SLIGHT PLASTICITY, VERY STIEF,

@0820

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

3.6. to YELLOW & BLACK @ 6.5-7.4

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

8-10.5 INCREASE IN GRAIN SIZE, LITTLE SILT THAN F SAND. MED PLASTIC MOIST STIFF

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

3.1 11.4-12. - SAMPLES 8-10.5 (COLOR)

BKG.

67SB05-05

@0835

12-16 12-14.5 SAA.

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

BKG

1010 COMPLETE CONSTRUCTION 67SB05.

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

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

1105 BEGIN @ SB01

— 67SB01 — (PID BKG 0.0)

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

67SB01 (CON'T)

4-8 4.0-4.9 SAA (BEACH SAND, SHELLS)
3.8
BKG 4.9 - 6.5 CLAY, LITTLE SILT, MAROON & DIM YELLOWISH, GREY, DAMP, SLIGHT PLASTICITY, V. STIFF.
6.5 - 8.0 ~~SAA BUT GL~~ SAA BUT.
67SB01-03 CLAY, LITTLE SILT, YELLOW
@ 1125 ORANGE, W/ BLK MOTTLING, DAMP
(CORE TO LIKELY SHALLOW GW) HIGH PLASTICITY, MOD STIFF.

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

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

WILL BUILD 67GW01 W/ 13' TD
BASED ON ELEVATION & PROXIMITY TO WETLAND
1150 DRILLER DEPART - LUNCH
AGENT ADOM W/ GW SAMPLING (R7GW11)
1255 DRILLERS @ 0.5' AUGERING
67GW01.
1405 DRILLERS COMPLETE 67GW01
CONSTRUCTION (SEE NEXT PAGE)

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

DRILLER PREP to DECON AND GROUT WELLS, WILL PICK UP SAND/CONSTRUCTION SUPPLIES TONIGHT.

DEVELOP

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

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

1610 COLLECT ~~E~~ 67ER03 FROM NEW DPT LINER

HEAD TO OFFICE TO MANAGE SAMPLES
- CALL CATHY D. RE: ENCORES TRACK, SHIPPED UPS, IN PR AT 0960 THIS MORNING. 1700 DEPARTED MAPR. 22 ~~7~~ PCL KS.B

THURS (3/25/10)

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

0805 SETUP @ 67SB08 - BEGIN.

- 67SB02 - (PID BKG 0.0)

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

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

67SB02-01 @ 0825 SEE NEXT PAGE

RPC

4.05
3

67SB02 (CONT)

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

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

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

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

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

0900 ABRO NOM & NASSER WORKING ON
COMPLETING 67GW08 @ SURFACE.
0950 READY to MOVE DRILL

• 67GW02 •

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

DEVELOP

0955 67GW07 TD 22.64' TOC HARD BOTTOM
SWL 18.80'
ABOVE STICKUP 2.6 → 7.84
∴ ≈ 1.3 GAL
VOC

0950 SURGE/BAIL 10 GAL FOR 35+ MIN.
TD. 22.64, SWL 20.8
TURBID BUT NOT NEARLY AS VISCOUS/SOAPY
AS 67GW03. - DELON BAILER.

1000 DRILLER DECONING / PREP FOR 67SB04

— 67SB04 — (PID BKG - 0.0)

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

67SB04DD
@ 1120 3.4-4.0 CLAY, LITTLE SILT, & SAND
STILL LOOK LIKE FILL

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

8-12 8-11.9 SILT & CLAY, DK OLIVE, MOIST TO
3.4 WET?, SLIGHT PLASTICITY, SOFT.
BILL

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

12-16 SAA W/ ZONE OF LIGHT GREY CLAY,
3.6 AND COLOR VARIES FROM ORANGE,
BILL to LT GREY/OLIVE, LITTLE BLK MATTLING

WILL BUILD GTGW04 WITH 16' TD

1150 DRILLERS DEPART.

1245 PROP TO ANCHOR 67GW04.
ABRAHAM/NASSER CONTINUE TO
COMPLETE WELLS & SURFACE

• 67GW04 •
TD 16' bgs
SCREEN 6-16' bgs
SAND to 4' bgs
1400 BENTONITE to 2' bgs.
PM 1400 PROP to MOVE DRUM.

1420 DEVELOP 67GW06
~~SWL~~ TD 20.82' HARD
SWL 12.71' → 8.11 (0.163)
APPROX STICKUP 2.5'
∴ 1.3± GAL/VOL

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

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

1500 SWL 18.65 AND RISING

ALLOW TO RECHARGE BAIL NEAR DRY SWL 20.65±
DELON BAILER.

1510 DRILLERS DEPART (READY FOR TOMORROW)

1520 DEVELOP 67GW05 TD 18.80 HARD

1525 ABRAHAM/NASSER DEPART SWL 14.92 → 3.88
APPROX STICKUP 2.9± ∴ 0.6± GAL/VOL

1536 SURGE/BAIL ≈ 2± GAL NEAR DRY (~7 min)
SWL 18.63 AND RISING.
ALLOW TO RECHARGE (SLIGHTLY TURBID)

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

1607 RETURN TO 67GW06 - SWL 16.27' TOC
BAIL 2.2± GAL NEAR DRY SWL 20.55±
DELON BAILER
- RETURN TO OFFICE/LANDFILL SAMPLE MGMT.

1715 DEPART WADR, MATRIX & CONDO

FRI (3/26/10)

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

— 67SB03 — (PID BKG 0.0)

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

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

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

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

• 67GW03 •
TD 15 bgs
SCREEN 5'-15' bgs
SAND to 3.5' bgs
BENTONITE TO 4' bgs. (1' bgs)
1000 DRILL / CLEAN UP, COMPLETING 67GW03 @ SURFACE, MOVE DRUMS.
1255 SITE CLEAN, BOLLARDS POINTED, DRUMS, 4 SOIL / 1 WATER @ STORAGE, DRILLERS DEPART TO LEAVE TRUCK, TRAILER & RIG @ ~~SH~~ ACCESS FROM SECURITY. (FOR SUMMA 75 INVEST ON MONDAY)

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

16.16

1305 DEVELOP 67GW01 TD ~~15.98~~ HORD
SWL 9.06 → 6.90'
APPROX STICKUP 3.0' ∴ 1.1 GAL/VOL

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

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

1340 13MW04
SWMU59 ~~13MW~~04 (9/17/97)
18' TD
8'-18' SCREEN
SWL 10.05
APPROX STICKUP 2.0±
VALVE ±8.0' bgs

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

1605 WELL SOUTH OF ENTRANCE (E SIDE OF ROAD)
TD 18.82'
SWL 10.71'
APPROX STICKUP 2.3±
8.41' bgs

SWMU59

SAT (3/27/10)

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

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

0910 - EQUILIBRATED BUT DRP STILL DROPPING (may SAMPLE SOON, SEE SAMPLE LOGS)

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

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

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

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

(67GW02 DEVELOP, CON'T)

1018 SWL 15.99' TOC, TD 16.21' NEARD
DETER BAILING 0.4± GALS. (1400 ml) MEASURED
— WILL SAMPLE w/ BLADDER PUMP W/O LOW FLOW DUE TO LOW YIELD (SIMILAR ~~[illegible]~~ to 67GW05 ∴ DECON BAILER DEVELOP

1035 ~~DEVELOP~~ 67GW04 - TD 18.50' TOC, NEARD
SWL 12.95 → 5.55
APPROX STICKUP 2.8±1 ∴ 0.9 GAL/VOL

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

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

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

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

1242 SWL 15.63
BAIL

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

1401 DEVELOP 67GW03 - TD 17.82' TOC
SWL 11.20 → 6.62
APPROX STICKUP 2.6' ∴ 41.1 GALL VOL
BOTTOM SOFT & SOMPY SIMILAR TO 67GW08
SURGE/BAIL 10+ GAL OVER 40+ MIN.

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

1615 DEPART NOPR.

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

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

- @ 1400: SUMMITS KICKOFF, WP, CREATE LABELS (COMPACUEM DID NOT PROVIDE.

MON (3/29/10

0645 ONSITE, PREP FOR SOMMU 75 SAMPLING, ORG OFFICE/TRUCK

0740 CALIBRATE PID to 103ppm.

0850 COLLECT 75FB01

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

— AWAITING ARRIVAL OF DRILLERS.

0902 DRILLERS ARRIVE, HEAD TO 75

0920 CONDUCT 75 KICKOFF & H&S MEETING

— UTILITIES CLEARED BY MORE CLIMBS.

0930 BEGIN

— 75SB03 — (PID BKG 0.0)

0-4 0-0.2 TOPSOIL

3.2 0.2-4.0 FILL - ~~FINE~~ SILT to MOD SAND, ~~SA~~ (BEACH SAND), LITTLE SHELLS., WHITISH/LT TAN DRY to DAMP, NON PLASTIC, LOOSE (FILL?)

BKG

75SB03-00 @0935

75SB03-01 @0940

4-8 4.0-8.0 SAND, DAMP.

2.9 BKG

75SB03-04 @0950

75SB03 (CONT)

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

3.2 BKG

— 75SB05 — (PID BKG 0.0)

0-4 0.0-0.1 TOPSOIL (LITTLE)

2.2 0.1-3.9 (SAME @ 75SB03 - BEACH SAND LITTLE SHELLS.)

BKG

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

75SB05-01 @1005

CONSTRUCTION FEATURE

— 75SB04 — (PID BKG 0.0)

0-4 ~~0-2.8 FILL~~

2.6 0.0-0.2 TOPSOIL

BKG 0.2-1.3 FILL. SILT to GRAVEL, SOME CLAY, BROWN, LIGHT GREY GRAVEL, DRY to DAMP, NON PLASTIC, LOOSE.

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

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

755B04 (CONT)

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

755B04-04
@1040

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

—755B02— (PID BKG 0.0)

0-4 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)

~~8-4~~

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

755B02-04
@1125

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

755B01 (CONT.)

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

SAME AS OTHERS

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

8-12 BEACH SAND, WET, SATURATED
2.1
BKG

1200 DRILLER GROUTING SBs,

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

1645 DEPART NAPR

CHECK @ CONDO - 67 & 75 SUMMA
SUM TCLS.

TUES (3/30/10)

0640 ONSITE, PREP TO GW SAMPLE, PLAN
TO MEET SURVEYORS: TRANSYSTEM, INC.
BOB MCNEAL 757 630 1675
GEORGE FRANKLIN 757 375 1310

0715 SURVEYORS ON SITE, KICKOFF MEETING,
SITE VISITS OF SUMMUS 75, 57, 67 & 61

~~RA 1030~~ RAK

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

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

1030 COLLECT 67GW03 (SEE SAMPLING
LOGS)

- COLLECT IDW SAMPLES (SEE GAILEY
LOG)
- PREP/PACK/MANAGE/SHIP SUMMUS 67 & 75
SAMPLES.

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

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

WED (3/31/10)

0645 ONSITE, PREP/ORG/PACK EQUIP

- @ 75 TRY TO REMOVE FLUSH MT. MARK. BORING / TD 14.35' TOC

0830 75-N 8.21' TOC

0832 75-S 8.33' TOC

(AS SUN. 3/28) TD 15.1' TOC

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

1000 COMPLETE GPS / END OF SWMN 59

CONSIDERATIONS — • CONCRETE FLUSH MOUNTS

• CLEARING (BUT NOT RIGHT WAY)

• UTILITIES. (FIRE HYDRANTS FIBER LINE)

• WPB/CHIP.

• 57GW02 CONFLICTS W/ MAPPING.

1020 @ SWMN 67 FOR SWLS.

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

1055 PRING @ SWMN 61 FOR SWLS

SEE PAGE 71 — SURVEYORS ONSITE.

— CLEAN/ORG/SNIP & MIP/INVENTORY VEHICLE.

1445 DEPART NAR.

@ CAMP — SWMN 59 SCHEDULE/LOGISTICS/AIRFARE/LODGING/PLANNING

SWM (4/25/10)

		SWL Ft TOC
1026	61GW21	7.56
1027	61GW23	7.58
1028	61GW06	7.26
1030	61GW05	4.94
1031	61GW23	3.03
1032	61GW03	2.67
1033	61GW24	6.10
1034	61GW27	10.20
1035	61GW01	6.15
1037	61GW30	5.71
1039	61GW02	7.14
1040	61GW36	9.33
1041	61GW04	6.18
1042	61GW07	6.05

SWM (4/25/10)

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

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

Environmental Technician – Darrin Hupe

Weather: Mostly Sunny, breezy, ~ 85°F

3/26/10

0645 - Arrive on Site. Prepare for GW Sampling @ SWMU67.

0745 - Arrive @ SWMU67 (See Field Data Sheets for purge & Sample Details for 67GW08)

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

1200 - Sampling Complete. Perform b/w. well Decon. on pump.

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

1325 - Sample Taken (67GW07)

1350 - Head to bld. 1205 to ice samples

*performed Daily pump decon. & Meter calibration

[redacted] -

1715 - Depart Site

3/27/10

0840 - Depart SJU for PIT.

10 DNH

SOIL BORING AND MONITORING WELL LOGS

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.8	3.0
Schedule 40 PVC Screen	2"	3.0	13.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	2.9 73%			BKG	*Continued from Sheet 1*	Sand 1 to 13'	
12	12.0							2" PVC Screen 3 to 13'	
13		D-4	3.0 75%			BKG	same as above but wet	13	99.3
14									
15									
16	16.0								96.3
17							End of Boring at 16.0'		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.8	3.0
Schedule 40 PVC Screen	2"	3.0	13.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11	D-3	3.8 95%			BKG	*Continued from Sheet 1*	Sand 1 to 13'; 2" PVC Screen 3 to 13'	
12								
13						13		100.0
14	D-4	3.8 95%			BKG			
15						SILT, some fine sand, little clan; orange and gray; moist; non plastic; med dense 15.2		97.8
16								97.0
17						End of Boring at 16.0'		
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

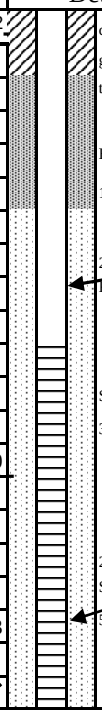
SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	5.0
Schedule 40 PVC Screen	2"	5.0	15.0

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



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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 59

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11							Continued from Sheet 1		
		D-3	3.5			BKG	moist; slight plasticity; soft	Sand 3 to 15'	
12	12.0		88%						
13							same as above but yellow, tan and whitish w/ dark olive mottling		
14		D-4	3.7 93%			BKG		2" PVC Screen 5 to 15'	
15								15	99.8
16	16.0								98.8
							End of Boring at 16.0'		
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	6.0
Schedule 40 PVC Screen	2"	6.0	16.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	3.4 85%			BKG	Continued from Sheet 1		
							11.9	Sand 4 to 16'	104.5
12	12.0						SILT, some fine sand and clay; orange and gray; moist; non plastic; loose to med hard		
13						BKG			
14		D-4	3.6 90%				color varies from orange to light gray and olive with little black mottling, also zones of light gray clay (12 - 16')	2" PVC Screen 6 to 16'	
15									
16	16.0								100.4
							End of Boring at 16.0'		
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	6.0
Schedule 40 PVC Screen	2"	6.0	16.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	3.1 78%			BKG	Continued from Sheet 1 color returns to similar as above 10.5'	Sand 4 to 16'	
12	12.0								
13						BKG			
14		D-4	2.7 68%					2" PVC Screen 6 to 16'	
15							SILT, some fine sand, little clay; light orange and light gray; damp to moist; non plastic, loose		
16	16.0								98.0
17							End of Boring at 16.0'		
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	8.0
Schedule 40 PVC Screen	2"	8.0	18.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	3.6 90%			BKG	Continued from Sheet 1	Sand 5.5 to 18'	
12	12.0								
13									
14		D-4	3.6 90%			BKG		2" PVC Screen 8 to 18'	
15									
16	15.0								
17							liner stuck in sampling reducing recovery		
18		D-5	2.3 58%			BKG	18		97.7
19								Soil	
20	20.0								95.7
21							End of Boring at 18.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	10.0
Schedule 40 PVC Screen	2"	10.0	20.0

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

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

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	3.5 88%			BKG	Continued from Sheet 1		
12	12.0								
13							same as above but orange brown and olive		
14		D-4	3.1 78%			BKG		Sand 7.5 to 20'	
15									
16	16.0								
17									
18		D-5	3.4 85%			BKG		2" PVC Screen 10 to 20'	
19									
20	20.0								98.2
21							End of Boring at 20.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

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

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

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

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

Remarks: PID background (BKG) - 0.0.

SAMPLE TYPE

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

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Schedule 40 PVC Riser	2"	~+2.5	10.0
Schedule 40 PVC Screen	2"	10.0	20.0

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

DRILLING CO.:	GeoEnviroTech, Inc.	BAKER REP.:	Robert Roselius
DRILLER:	William Rodrigez	BORING NO.:	67SB08

Baker

Michael Baker Jr., Inc.

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: Naval Activity Puerto Rico SWMU 67

PROJ. NO.: 119197, 6.5 BORING NO.: 67SB08

SAMPLE TYPE

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

DEFINITIONS

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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. Datum)
11		D-3	3.4 85%			BKG	Continued from Sheet 1		
12	12.0								
13							same as above w/ iron/rust staining 12 - 15.5'; damp to moist		
14		D-4	3.5 88%			BKG		Sand 7.5 to 20'	
15									
16	16.0								
17							same as above w/ less iron/rust staining (olive, blk & white); moist (liner is wet)		
18		D-5	3.1 78%			BKG		2" PVC Screen 10 to 20'	
19									
20	20.0						iron/rust staining 19.0 - 19.1'		99.3
21							End of Boring at 20.0'		
22									
23									
24									
25									
26									
27									
28									
29									
30									

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

DRILLER: William Rodrigez BORING NO.: 67SB08 SHEET 2 OF 2

PROJECT NUMBER	BORING NUMBER	
651869	SB-09	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 1/24/2014

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT USED: Hand Auger

WATER LEVELS: N/A START: 1/23/2014 END: 1/24/2014 LOGGER : P.Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-0.5'	6"	Hand	N/A	0-0.5' bgs SILTY SAND (SM), pale brown (10YR 6/3 dry, loose, fine to medium grained sand, non plastic non cohesive	
1						
	0.5-5.3'	30"	Hand	N/A	0.5-5.3' bgs SANDY SILT WITH GRAVEL (ML), ver pale yellow (10YR 7/4), moist, very stiff, low plasticit cohesive, coarse grained sand, fine subangular gra (few), mottled with browish yellow (10YR 6/8) silt	Encountered rocks and what appears to be an old coral bed. Refusal at 5' 3"; unable to advance any further.
2						
						Collected NAPR-W67-SB09-0507 and all associated QA/QC samples
3						
4						
5						
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 1/25/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-10	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB10 DATE: 1/24/2014

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT USED: Hand Auger

WATER LEVELS: N/A START: 1/23/2014 END: 1/24/2014 LOGGER : P.Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
	0-0.5'	6"	Hand	N/A	0-0.5' bgs SILTY SAND (SM), pale brown (10YR 6/3 dry, loose, fine to medium grained sand, non plastic non cohesive	
1						
	0.5-5.3'	30"	Hand	N/A	0.5-4.5' bgs SANDY SILT WITH GRAVEL (ML), very pale yellow (10YR 7/4), moist, very stiff, low plasticit cohesive, coarse grained sand, fine subangular grav (few), mottled with browish yellow (10YR 6/8) silt	Encountered rocks and what appears to be an old coral bed. Refusal at 4' 5"; unable to advance any further.
2						
						No samples collected.
3						
4						
5						
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 1/25/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-09R	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), yellowish brown (10YR 5/4 with very fine to fine sand	Collected **NAPR-W67-SB09R-0507** and **NAPR-W67-SB09RP-0507**
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-10	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), yellowish brown (10YR 5/6) silt with very fine to fine grained sand	Collected **NAPR-W67-SB10-0507**
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-11	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), dark yellowish brown (10YR 4 silt with fine to medium grained sand.	Collected **NAPR-W67-SB11-0507**
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-12	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), dark yellowish brown (10YR silt with fine to medium grained sand	Collected **NAPR-W67-SB12-0507**
6						
7	7.0 - 9.0	24"	Probe	N/A	CLAY WITH SAND (CL), dark grayish brown (10YR 4 clay with medium plasticity with very fine sand	Collected **NAPR-W67-SB12-0709**
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-13	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), yellowish brown (10YR 5/6 silt with very fine to fine sand	Collected **NAPR-W67-SB13-0507**
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

PROJECT NUMBER	BORING NUMBER	
651869	SB-14	SHEET: 1 OF 1

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 8012, SWMU-67 LOCATION : SWMU 67_SB09 DATE: 7/3/14

WEATHER: Clear/Hot/Sunny DRILLING CONTRACTOR : Geo Enviro Tech

DRILLING METHOD AND EQUIPMENT USED: GeoProbe

WATER LEVELS: N/A START: 7/3/2014 END: 7/3/2014 LOGGER : R. Fields

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Above Hole
1						
2						
3						
4						
5	5.0 - 7.0	24"	Probe	N/A	SILT WITH SAND (ML), brown (10YR 4/3), silt with very fine to fine sand	Collected **NAPR-W67-SB14-0507** Collected associated MS/MSD sample
6						
7						
8						
9						
10						

Sampler Signature: Pat Murphy Date: 7/10/2014

GROUNDWATER SAMPLING FORMS

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW01 DATE: 3-27-10

PROJECT: 67 Phase I RFI WEATHER: Sunny + Warm 88° F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y / N

Casing (outer) G Casing (inner) 2" SWL Reference Mark Reference Mark Location? TOC N

Casing Dia.: 4" Sample PRO-TOP Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 9.01 Time: 1332 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 8.03 Time: 1341 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 12.44 Time: 1553

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 16.16 Screened Interval (ft.): 6.16 - 16.16 Top of Casing

Pump Intake Set @ (ft.): 13.0 Controller Settings / Pressure: CPU 5

Comments:

SAMPLE DATA

Sample ID #: 67GW01 Dup.: Y / N - (ID#:)

Sample Time: 1535 MS / MSD: Y / N Field Filtered: Y / N

Sampled By: A. Carter Signature:

Sample Description:

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA Vials	3	HCL	App. IX VOCs
40 mL VOA Vials	2	HCL	App IX VOCs
1 L Amber	2	—	App IX SVOC.
1 L Amber	2	—	TPH DRO
1000 mL (HDPE)	1	HNO_3	App IX. Metals
1000 mL (HDPE)	1	HNO_3	App IX. Metals (Dissolved)

GENERAL COMMENTS

Final SWL (Pump in) = 12.10

Final SWL (Pump out) = 12.44

12.10

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW01
DATE: 3-27-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Greiley
SAMPLE ID: 67GW01

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1341	8.03	- (Water Level : Post-Pump Installation, Pre-Start)								
1345	- (Start of Purging)									
1352	9.15	300	60	27.69	4.939	2.36	6.98	-82.1	1000	Turbid - No odor
1357	9.34	200	40	27.84	4.940	1.98	6.96	-87.5	1000	Turbid - No odor
1402	9.40	350	70	27.99	4.949	2.34	6.96	-89.1	858	" "
1407	9.51	350	70	27.83	4.956	1.96	6.96	-90.3	569	" "
1412	9.60	400	80	27.78	4.949	1.52	6.96	-90.0	451	" "
1417	9.65	400	80	27.61	4.954	1.27	6.96	-85.9	253	Clearing slightly - No odor
1422	9.75	380	76	27.52	4.959	1.28	6.95	-78.4	166	Clearing - No odor
1427	9.82	380	76	27.42	4.965	1.30	6.95	-69.7	112	" "
1432	9.91	400	80	27.31	4.970	1.22	6.95	-64.1	90.9	" "
1437	9.95	350	70	27.38	4.970	1.05	6.95	-58.2	81.0	" "
1442	9.97	200	40	27.48	4.972	1.00	6.96	-54.5	71.8	Pump Adjust " "
1447	10.0	200	40	27.59	4.975	0.95	6.96	-50.5	70.6	Clearing - No odor
1452	10.04	380	76	27.45	4.974	0.89	6.96	-60.8	79.1	" "
1457	10.12	380	76	27.32	4.967	0.87	6.96	-61.3	72.7	" "
1502	10.14	350	70	27.40	4.970	0.76	6.96	-53.2	60.7	" "
1507	10.17	250	50	27.45	4.974	0.71	6.97	-47.9	56.4	" "
1512	10.22	200	40	27.36	4.978	0.73	6.98	-51.8	41.6	" "
1517	10.25	250	50	27.25	4.979	0.72	6.96	-48.2	39.2	" "
1522	10.35	250	50	27.27	4.976	0.72	6.96	-47.8	34.0	" "
1527	10.40	250	50	27.19	4.978	0.71	6.96	-46.7	38.9	Clearing
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW02 DATE: 3-28-10

PROJECT: 67 Phase I RFI WEATHER: Sunny 51°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G Casing (inner) 2" SWL Reference Mark ____ Reference Mark Location? TOC N

Casing Dia.: 4" Square Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.09 Time: 0920 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 11.83 Time: 0930 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 16.35 Time: 1010

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): Screened Interval (ft.): 6.21 - 16.21 (TOC) (3 - 13 bgs)

Pump Intake Set @ (ft.): 15.0 (From TOC) Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW02 Dup.: Y / (N) - (ID#:)

Sample Time: 0940 MS / MSD: Y / (N) Field Filtered: Y / (N)

Sampled By: A. Gailey Signature:

Sample Description: Very low yield - Sample obtained at 0940.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
3 VOA Vials (40ml)	3	HCL	App. IX VOC
VOA Vials (40ml)	2	HCL	TPH GRO
1L Amber	2	—	App. IX SVOC
1L Amber	2	—	TPH DRO
1000 ml (HDPE)	1	HNO_3	App. IX Metals
1000 ml (HDPE)	1	HNO_3	App. IX Metals (Dissolved)

GENERAL COMMENTS

Final SWL = 15.27 (Pump out)

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW02
DATE: 3-28-10
PROJECT: PHASE I RFI
.67

SAMPLER (s): A. Gainey
SAMPLE ID: 67GW02

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0930	11.83	- (Water Level : Post-Pump Installation, Pre-Start)								
	- (Start of Purging)									
0940		Very low	yield	-	Sample	obtained				
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW03 DATE: 3/30/10

PROJECT: SWMU 67 WEATHER: P. Cloudy MID 80s

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G1 Well Cap G1 PVC Locking Cap/Plug G1

Cap Lock G1 Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G1 Casing (Inner) 2" SWL Reference Mark ____ Reference Mark Location? TOC N

Casing Dia.: 4" SQUARE PRO-TOP Casing Material: PVC Flushmount / (Stickup)

Comments: 18.15' TD TOC

(OTHER): Static Water Level (ft.): 11.33' TOC Time: 0900 (Pre-Pump Installation)

Depth to Product (ft.): NA

Water Level (ft.): 11.20' TOC Time: 0905 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.15' TOC Time: 1045

PID Reading (PPM) - Unopened: BKG Opened: BKG (BKG 0.0 ppm)

PURGE DATA

Pump Type: BLADDER

From Boring Log: Total Depth (ft.): 15' bgs Screened Interval (ft.): 5-15' bgs

Pump Intake Set @ (ft.): 12' bgs / 15±' TOC Controller Settings / Pressure: 10±

Comments:

SAMPLE DATA

Sample ID #: 67GW03 Dup.: Y / (N) (ID#:)

Sample Time: 1030 MS / MSD: Y / (N) Field Filtered: (Y) / N

Sampled By: ROBERT ROSELINS Signature: [signature]

Sample Description: CLEAR

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA VIALS	3	HCL	APP IX VOCS
"	2	"	TPH GRO
1 L AMBER	2	—	SVOCS
"	2	—	TPH DRO
1 L (HDPE)	1	HNO_3	METALS (TOTAL)
"	1	"	METALS (DISSOLVED)

GENERAL COMMENTS

SWL 11.95' POST PUMP.

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW03
DATE: 3/30/10
PROJECT: SWMU 67

SAMPLER (s): ROBERT ROSELINS
SAMPLE ID: 67GW03

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0905	11.20	- (Water Level : Post-Pump Installation, Pre-Start)								
0917	- (Start of Purging)									ALLOW FLOW CELL TO FILL, ADJUST PUMP
0925	11.60	1300	162.5	28.16	2.296	2.15	7.03	84.1	264	
0930	11.60	600	120	28.12	2.313	3.17	7.02	76.3	193	
0935	11.62	800	160	28.14	2.321	2.27	7.01	68.0	107	ADJUST PUMP
0940	11.60	600	120	28.16	2.329	2.03	7.01	63.2	80.8	
0945	11.60	575	115	28.19	2.334	1.83	7.01	62.3	43.0	
0950	11.59	550	110	28.26	2.338	1.63	7.02	61.9	30.8	
0955	11.61	625	125	28.24	2.340	1.56	7.02	59.5	25.3	
1000	11.61	600	120	28.25	2.337	1.60	7.02	56.7	21.1	
1005	11.61	600	120	28.30	2.333	1.51	7.03	55.4	16.4	
1010	11.60	575	115	28.33	2.331	1.47	7.03	54.6	13.2	
1015	11.60	575	115	28.37	2.332	1.39	7.03	54.1	10.9	
1020	11.60	575	115	28.40	2.332	1.37	7.03	53.4	11.1	
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW04 DATE: 3-28-10

PROJECT: 67 Phase I RFI WEATHER: Sunny + Hot 89° F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock G Cover Bolts N/A Water over PVC? Y (N)

Casing (outer) G Casing (inner) 2" SWL Reference Mark Reference Mark Location? TOC N

Casing Dia.: 4" Square Pro-Tect Casing Material: PVC Flushmount / Stickup

Comments:

(OTHER): Static Water Level (ft.): 12.89 Time: 1220 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.76 Time: 1225 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.77 Time: 1343

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 18.50 (TOC) Screened Interval (ft.): 9.50 - 19.50 (TOC)

Pump Intake Set @ (ft.): 16.50 (TOC) Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW04 Dup.: Y (N) (ID#:)

Sample Time: 1320 MS / MSD: Y (N) Field Filtered: Y (N) yes

Sampled By: A. Gainey Signature:

Sample Description:

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA Vials	3	HCl	App IX VOC
40 mL VOA Vials	2	HCl	TPH GRO
1L Amber	2	—	SVOC
1L Amber	2	—	TPH DRO
1000 mL (HDPE)	1	HNO3	METALS
1000 mL (HDPE)	1	HNO3	METALS (Dissolved)

GENERAL COMMENTS

Final SWL = 15.81 (pump out)

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW04
DATE: 3-28-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Gaston
SAMPLE ID: 67GW04

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/-0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1225	12.76	- (Water Level : Post-Pump Installation, Pre-Start)								
1230	- (Start of Purging)									
1235	13.10	1000	200	30.98	4.702	3.14	6.99	15.6	32.6	Clear. No odor. [Pump Adjust]
1240	13.18	350	70	30.45	4.711	2.37	6.96	18.9	16.2	" "
1245	13.24	250	50	30.78	4.709	1.65	6.97	31.9	10.9	" "
1250	13.29	200	40	31.10	4.714	1.52	6.95	35.4	8.85	" "
1255	13.43	300	60	30.93	4.726	1.14	6.94	42.2	7.80	" "
1300	13.53	300	60	30.94	4.720	0.92	6.93	41.8	6.91	Clear. No odor
1305	13.57	300	60	30.67	4.721	0.97	6.93	41.1	5.94	Clear. No odor
	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW05 DATE: 3-27-10

PROJECT: SWMU 67 Phase I RFI WEATHER: Sunny and warm 81°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: G Cover Bolts: N/A Water over PVC? Y / (N)

Casing (outer): G Casing (inner): 2" SWL Reference Mark: Reference Mark Location? TOC N

Casing Dia.: 4" Sanuve Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.89 Time: 1113 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.70 Time: 1125 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 18.95 Time: 1202

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 18.95 Screened Interval (ft.):

Pump Intake Set @ (ft.): 17.95 Controller Settings / Pressure: Approx. 5.

Comments:

SAMPLE DATA

Sample ID #: 67GW05 Dup.: Y / (N) - (ID#:)

Sample Time: 1130 MS / MSD: Y / (N) Field Filtered: (Y) / N

Sampled By: A. Gentry Signature:

Sample Description: Very low yield well - Sample obtained and No Parameters were Taken. Water Sampled was Clear with No odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 mL VOA	3	HCl	App IX VOC
40 mL VOA	2	HCl	TPH GRO
1L Amber	2	—	App IX SVOC
1L Amber	2	—	TPH DRO
1000 mL HDPE	1	HNO_3	Metals
1000 mL HDPE	1	HNO_3	Metals (Dissolved)

GENERAL COMMENTS

Final SWL = 15.47

Final SWL (Pump out) = 15.77

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW05
DATE: 3-27-10
PROJECT: 67 Phase I RFI

SAMPLER (s): A. Geiger
SAMPLE ID: 67GW05

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1113	12.89	- (Water Level : Post-Pump Installation, Pre-Start)								
	- (Start of Purging)									
1130	Very	Low	Yield	-	Sample	Taken.				
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									**Sampler Signature:**

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW06 DATE: 3-27-10

PROJECT: WMU 67 Phase I RFI WEATHER: Mostly Sunny - upper 70's

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad: G Well Cap: G PVC Locking Cap/Plug: G

Cap Lock: G Cover Bolts: N/A Water over PVC? Y / (N)

Casing (outer): G Casing (inner): 2" SWL Reference Mark: Reference Mark Location? TOC N

Casing Dia.: 4" Carbone Pro-Top Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 12.69 Time: 0820 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 12.55 Time: 0830 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 20.91 Time: 1032

PID Reading (PPM) - Unopened: Background Opened: Background

PURGE DATA

Pump Type: Bladder Pump

From Boring Log: Total Depth (ft.): 20.82 Screened Interval (ft.): 8.0 - 18.0 Bgs

Pump Intake Set @ (ft.): ~~15~~ 14.50 Bgs Controller Settings / Pressure: 5

Comments:

SAMPLE DATA

Sample ID #: 67GW06 Dup.: Y / (N) (ID#:)

Sample Time: 0940 MS / MSD: Y / (N) Field Filtered: (Y) / N

Sampled By: A. Gainey Signature:

Sample Description: Formation Water. Clear and No odor.

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml VOA Vials	3	HCL	App. IX VOC
40 ml VOA Vials	2	HCL	TPH GRO
1L Amber	2	—	APP IX. SVOC
1L Amber	2	—	TPH DRO
1000 ml (HDPE)	1	HNO_3	APP. IX METALS
1000 ml (HDPE)	1	HNO_3	APP. IX METALS (Dissolved)

GENERAL COMMENTS

water level at 1005 = 14.50

Final SWL (Post Sampling) = 15.25

Final SWL (Pump out) = 15.44

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW06
DATE: 3-27-10
PROJECT: SWMU 67 Phase I RFI

SAMPLER (s): A. Gainey
SAMPLE ID: 67GW06

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0830	12.55	- (Water Level : Post-Pump Installation, Pre-Start)								
0835	- (Start of Purging)									
0840	12.90	1000	200	27.96	4.449	4.48	6.42	30.6	12.7	Clear - No odor
0845	12.95	150	30	27.80	4.442	3.85	6.53	-13.1	14.3	Clear - No odor.
0850	13.10	300	60	28.01	4.407	2.90	6.73	9.2	12.2	" "
0855	13.20	350	70	28.11	4.391	2.38	6.86	29.4	10.7	" "
0900	13.27	350	70	28.16	4.382	2.07	6.92	31.0	9.70	" "
0905	13.36	300	60	28.29	4.381	2.14	6.97	15.9	9.46	" "
0910	13.46	400	80	28.45	4.389	2.04	6.99	7.0	10.1	" "
0915	13.52	350	70	28.53	4.401	1.96	7.00	8.9	9.09	" "
0920	13.57	300	60	28.57	4.409	1.89	7.01	8.3	8.69	
0925	13.67	350	70	28.57	4.412	1.90	7.01	7.8	9.91	
	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW07 DATE: 3/26/10

PROJECT: NAPR - SWMU 67 WEATHER: Sunny, breezy, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad New Well Well Cap G PVC Locking Cap/Plug G

Cap Lock New Well Cover Bolts N/A Water over PVC? Y / (N)

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 14.72 Time: 1237 (Pre-Pump Installation)

Depth to Product (ft.): —

Water Level (ft.): 14.7 Time: 1245 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 22.75 Time:

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech 1.66SS18 Bladder

From Boring Log: Total Depth (ft.): 22.75 (Field Measured) Screened Interval (ft.):

Pump Intake Set @ (ft.): 20.5 Controller Settings / Pressure: CPM4 10/5, P = 30'

Comments:

SAMPLE DATA

Sample ID #: 67GW07 Dup.: Y / (N) (ID#:)

Sample Time: 1325 MS / MSD: Y / (N) Field Filtered: (Y) N

Sampled By: D. Hupe Signature:

Sample Description: Clear. No Odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml	3	HCL	VOC's
"	2	"	GRO
1L Amber	2	None	DRO
" "	2	"	SVOC / PAH
1L pl	1	HNO3	T. Metals
" "	1	"	Diss. Metals

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW07
DATE: 3/26/10
PROJECT: NAPR - SWMU67

SAMPLER (s): D. Hope
SAMPLE ID: 67GW07

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL. (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
1245	14.70	- (Water Level : Post-Pump Installation, Pre-Start)								
1250	- (Start of Purging)									
1255	14.94	1300	260	28.83	3.498	0.83	6.93	89	30	clear, No odor
1300	14.93	2500	240	28.72	3.482	1.17	6.93	85	10.6	
1305	14.95	3650	230	28.68	3.475	0.73	6.93	80	5.6	
1310	14.94	4800	230	28.65	3.476	055	6.93	75	5.1	
1315	14.94	5950	230	28.65	3.475	0.53	6.93	73	4.8	
1320	14.95	7200	250	28.66	3.475	0.51	6.92	72	4.7	
1325	- **Sample Time** (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

WELL DETAIL AND SAMPLING LOG

Well ID #: 67GW08 DATE: 3/26/10

PROJECT: NAPR - SWMU67 WEATHER: Mostly Sunny, breezy, ~85°F

WELL DATA

(CONDITIONS): (G = Good, F = Fair, P = Poor)

Pad G Well Cap G PVC Locking Cap/Plug G

Cap Lock Non Well Cover Bolts N/A Water over PVC? Y (N)

Casing (outer) G Casing (inner) G SWL Reference Mark G Reference Mark Location? PVC

Casing Dia.: 2" Casing Material: PVC Flushmount / (Stickup)

Comments:

(OTHER): Static Water Level (ft.): 15.01 Time: 0818 (Pre-Pump Installation)

Depth to Product (ft.): N/A

Water Level (ft.): 15.01 Time: 0829 (Post-Pump Installation, Pre-Purge)

Total Well Depth (ft.) - Post Sampling: 22.25 Time:

PID Reading (PPM) - Unopened: 0 Opened: 0

PURGE DATA

Pump Type: Geotech 1.66SS18 Bladder

From Boring Log: Total Depth (ft.): 22.25 (Field Measured) Screened Interval (ft.):

Pump Intake Set @ (ft.): 20.0 Controller Settings / Pressure: CPM4 10/5

Comments:

SAMPLE DATA

Sample ID #: 67GW08 Dup. (Y) N - (ID#: 67GW08D)

Sample Time: 1000 MS / MSD: (Y) N Field Filtered: (Y) N

Sampled By: D. Hupe Signature: [signature]

Sample Description: clear. No odor

SAMPLE CONTAINERS

Bottle Type	Qty.	Preservative	Analysis
40 ml	3	HCL	VOC's
" "	2	"	GRO
1l Amber	2	None	PRO
" "	2	"	SVOC / PAH
1l 500ml pl	1	HNO3	T. Metals
1l pl.	1	"	Diss. Metals

GENERAL COMMENTS

LOW FLOW PURGE DATA SHEET

WELL ID: 67GW08
DATE: 3/26/10
PROJECT: NAPR-SWMU67

SAMPLER (s): D. Hope
SAMPLE ID: 67GW08

TIME [3-5 min.]	DEPTH TO WATER (ft) [<0.3 ft.]	VOL (ml)	PURGE RATE (ml/min) [250-500 ml/min]	TEMP. (°C)	SP. COND. (mS/cm) [+/- 3%]	D.O. (mg/l) [+/- 10%]	pH (S.U.) [+/- 0.1]	ORP (mV) [+/- 10]	TURBIDITY (NTU) [+/- 10%]	COMMENTS (Sample descrip.: color, clarity, odor - issues and adjustments, etc.)
0829	15.01	- (Water Level : Post-Pump Installation, Pre-Start)								
0834	- (Start of Purging)									
0839	15.06	900	180	28.20	3.404	5.49	7.09	-29	over	very Turbid.
0844	15.02	1650	150	28.23	3.399	4.70	7.08	-38	over	
0849	15.02	2400	150	28.10	3.388	2.47	7.07	-63	684	Emptied Flow Cell
0855	15.01	—	—	28.53	3.375	2.53	7.10	-50	363	
0900	15.02	650	130	28.57	3.381	1.17	7.06	-74	191	
0905	15.02	1300	130	28.81	3.375	0.92	7.06	-84	71	
0910	15.02	1950	130	28.52	3.366	0.78	7.05	-90	37	
0915	15.02	2900	190	28.04	3.356	0.64	7.04	-100	27	clear
0920	15.03	3500	120	28.76	3.354	0.56	7.04	-88	19.3	
0925	15.03	4200	140	28.77	3.363	0.52	7.04	-100	15.5	
0930	15.03	5200	200	28.69	3.360	0.43	7.04	-105	12.0	
0935	15.03	5900	140	28.86	3.362	0.42	7.04	-109	10.5	
0940	15.02	6400	100	28.79	3.363	0.43	7.04	-109	10.0	
0945	15.04	7150	150	28.81	3.361	0.38	7.04	-112	8.5	
0950	15.04	7900	150	28.94	3.365	0.38	7.03	-112	8.2	
0955	15.04	8600	140	28.84	3.365	0.38	7.03	-110	7.9	
1000	- Sample Time (Note: Flow rate to be btwn. 100 - 250 ml/min.)									Sampler Signature:

Note: Stability achieved when 3 consecutive readings fall within specific parameter ranges shown in the above header.

DAILY METER CALIBRATION RECORDS

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #: 05C1158

Date: 3/26/10
Time: 1070

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.93	4.00
Buffer:	7	6.97	7.00
Buffer:	10	9.84	10.00
ORP (mV's)			
Std.:	231	237	231
Sp.Cond. (mS/cm)			
Std.:	1.409	1.289	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.43	8.91
Temp. (Celsius)		23.42	N/A

Model: RAE 2000
Serial #: U49922X

Date: _____
Time: _____

	Initial	Adjusted
Isobutylene (100ppm)	94	100

Model: Hanna
Serial #: 98703

Date: _____
Time: _____

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	14.3	15.00

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #:

Model: RAE 2000
Serial #:

Date: 3-27-10
Time: 0707

Date:
Time:

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	4.12	4.00
Buffer:	7	7.02	7.00
Buffer:	10	9.93	10.00
ORP (mV's)			
Std.:	231	227.1	231.0
Sp.Cond. (mS/cm)			
Std.:	1.409	1.386	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	8.62	8.64
Temp. (Celsius)		23.11	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

HANNA Turbidimeter

Model: ~~Lamotte 2020~~
Serial #: 456029 X

(Pre-Sampling Calibration) ·Sampling Calibration)

Date: 3-27-10
Time: 0736

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	15	15.3	15.0

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #: 05 0 11 58 AT

Model: RAE 2000
Serial #:

Date: 3-28-10
Time: 0750

Date: _____
Time: _____

		Initial	Adjusted		Initial	Adjusted
pH (Std. Units)						
Buffer:	4	4.20	4.00	**Isobutylene (100ppm)**		
Buffer:	7	6.93	7.00			
Buffer:	10	9.97	10.00			
ORP (mV's)						
Std.:	231	228.9	231.0			
Sp.Cond. (mS/cm)						
Std.:	1.409	1.425	1.411			
D.O. (mg/l)						
Baro. Pressure (mm/Hg):	760	9.36	9.45			
Temp. (Celsius)		24.82	N/A			

HANNA Turbidity Meter

Model: ~~Lamotte 3020~~
Serial #: HI 98703

(Pre-Sampling Calibration) -Sampling Calibration)
Date: 3-28-10
Time: 0900

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~10~~ 15	15.0	15.0

DAILY METER CALIBRATION RECORD

Model: YSI 556 MPS
Serial #:

Model: RAE 2000
Serial #:

Date: 3-30-10
Time: 0825

Date: _____
Time: _____

		Initial	Adjusted
pH (Std. Units)			
Buffer:	4	3.91	4.00
Buffer:	7	7.00	7.00
Buffer:	10	10.03	10.00
ORP (mV's)			
Std.:	231	232.4	231.0
Sp.Cond. (mS/cm)			
Std.:	1.409	1.415	1.409
D.O. (mg/l)			
Baro. Pressure (mm/Hg):	760	6.88 ~~12.19~~ ABC 3-30-10	8.38
Temp. (Celsius)		24.25	N/A

	Initial	Adjusted
Isobutylene (100ppm)		

HANNA Turbidity Meter

Model: ~~Lamotte 2020~~
Serial #: HI 98703

(Pre-Sampling Calibration) -Sampling Calibration)

Date: 3-30-10
Time: 0840

		Initial	Adjusted
Turbidity (NTU's)			
Std.:	~~20~~ 15	15.0	15.0

CHAIN-OF-CUSTODY FORMS

№ 03848

Page 1 of 2

70

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Residual Chlorine Present? Yes ____ No ✓

CHAIN OF CUSTODY

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

Courier FedEx
Airbill No. 8685 9528 4927
Sampling Complete? Y or (N)

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or (N)? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No. (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfite	App IX VOCs	App IX SVOCs	App IX Metals	App IX Metals (Dissolved)	TPH DRO	TPH GRO					Metals	Preservation			
1003194-07	67SB08-00	3/22/10	1325	SO	6					1	2	3	1	1		✓	1					/				
-08	67SB08-00 D		1325	SO	6					1	2	3	1	1		✓	1					/				
-09	67SB08-01		1330	SO	6					1	2	3	1	1		✓	1					/				
-10	67SB08-05	3/22/10	1350	SO	6					1	2	3	1	1		✓	1					/				
-11	67SB07-00	3/23/10	0805	SO	6					1	2	3	1	1		✓	1					/				
-12	67SB07-01		0810	SO	6					1	2	3	1	1		✓	1					/				
-13	67SB07-05		0830	SO	6					1	2	3	1	1		✓	1					/				
1003197-04	67FB01		1030	O	10	3	1					3	2	~~1~~		2	2					*2				
1003197-03	67ER02	3/23/10	1045	RI	10	3	1					3	2	1		2	2					*2				
1003197-05	67TB01	3/22/10		TB	2	2*						2③					( ) recd 3-40ml vials labeled GRO					/				

Lab Use Only

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

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

Comments KM 03.24.10

*① 3-TB's (67TB01) recd.; marked as "2" on COC (recd 3 vials)

Sample Custody

Relinquished by: [signature]	Date/Time: 3-23-10 1700	Received by: K. Manning	Date/Time: 03.24.10 0910
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 08, 2.1, 1.3 °C

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

White & Yellow copy to lab • Pink copy for customer 6N0010

16069

Page 2 of 2

71

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Residual Chlorine Present? Yes ____ No ✓

CHAIN OF CUSTODY

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

Courier FedEx
Airbill No. 8685 9528 4927
Sampling Complete? Y or (N)

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs	App IX SVOCs (8oz)	App IX Metals (2oz)	App IX Metals (Dissolved)	TPH DRO *	TPH GRO	TOC (1-8oz.)				Metals	E.F. (Ds Yield)			
1003194-01	67SD01	3/22/10	1400	SO	7			*		1	2	3	1	1		✓	1	1				/	/			
1003197-01 1003198-01	67SW03		1310	SW	12	6		2		1	2	3	2	1	1	2	3					<2	<2			
1003194-02	67SD02		1530	SO	7					1	2	3	1	1		✓	1	1				/	/			
-03	67SD03		1310	SO	7					1	2	3	1	1		✓	1	1				/	/			
-04	67SD01 D	*		SO	7					1	2	3	1	1		✓	1	1*	did not receive containers for TOC per Adam no TOC needed			/	/			
1003194-01	67SD01 MS	*		SO	7					1	2	3	1	1		✓	1	1				/	/			
	67SD01 MSD	*	1310	SO	7					1	2	3	1	1		✓	1	1				/	/			
1003194-05	67SD04		1515	SO	7					1	2	3	1	1		✓	1	1				/	/			
-06	67SD05	3/22/10	1510	SO	7					1	2	3	1	1		✓	1	1				/	/			
1003197-02	67ER01	3/22/10	1550	RI	10	5		2				3	2	1	*	2	2					<2	/			

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: K. Manning
Sample Order Entry By: [illegible]
Samples Received in Good Condition? (Y) or N
If no, explain:

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

Comments

* time on containers for 67SD01D, 67SD01MS & 67SD01MSD have 1400 for time on containers

Sample Custody

Relinquished by: [signature]	Date/Time: 3/23/10 1700	Received by: K. Manning	Date/Time: 03.24.10 0910
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?		Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N — Cooler Temp: 08, 2.1, 1.3 °C

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

White & Yellow copy to lab • Pink copy for customer SN0010

16067

72

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CHAIN OF CUSTODY

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

Courier FedEx
Airbill No. 8685 9528 4721
Sampling Complete? Y or N

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? Y or N
Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other ~~Sodium Thiosulfate~~	App IX VOCs (2-NaHSO4 1-MeOH)	App IX SVOCs (2-AL)	App IX Metals (2oz/PL)	App IX Metals (Dissolved)	TPH DRO (2-AL)	TPH GRO (4oz/2oz MeOH)					pH / Sample Info (Lab Use) Metals
1003194-14	67SB05-00	3/24/10	0810	SO	6					1	2	3	1	1		✓	1					
-15	67SB05-01		0820		6					1	2	3	1	1		✓	1					
-16	67SB05-05		0835		6					1	2	3	1	1		✓	1					
-17	67SB01-00		1110		6					1	2	3	1	1		✓	1					
-18	67SB01-01		1115		6					1	2	3	1	1		✓	1					
-19	67SB01-01D		~~1125~~ 1115		6					1	2	3	1	1		✓	1					
-20	67SB01-03		1125	SO	6					1	2	3	1	1		✓	1					
1003197-06	67ER03	3/24/10	1610	RI	10	5		1				3	2	1		2	2					<2
-07	67ER04	3/25/10	0730	RI	10	5		1				3	2	1		2	2					<2
-09	67TB02	3/24/10		TB	5	5						3					2					

Lab Use Only

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

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

Comments

~~Residual Chlorine Present?~~
Yes ____ No ✓

Sample Custody

Relinquished by: [signature]	Date/Time: 3/25/10 1500	Received by: Jennifer Doler	Date/Time: 3/26/10 0915
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or N If yes, where?		Custody Seal(s) intact? Y or N	On Ice? Y or N	Cooler Temp: 2.3, 2.4, 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

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16066

73

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CHAIN OF CUSTODY

501 Madison Ave
Cary, NC 27511
Phone: 919-379-4100 Fax 919-379-4040

Courier FedEx
Airbill No. 8685 9528 4721
Sampling Complete? Y or N

Client/Reporting Information	Project Information
Company Name: Baker Environmental, Inc.	Project Name: SWMU 67
Address: 100 Airside Drive	Sampling Location: Puerto Rico
City State Zip: Moon Twp., PA 15108	Turnaround time: Standard
Project Contact: Mark Kimes	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 412-269-2009	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: A. Gailey/R. Roselius	Are high concentrations expected? Y or N? If yes, which ID(s)?

Requested Analysis (include method and bottle type): App IX VOCs 2-NaZSO4 1-MeOH; App IX SVOCs 2-AL; App IX Metals 2oz/PL; App IX Metals (Dissolved); TPH DRO 2-AL; TPH GRO 4oz/2-40ml

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs	App IX SVOCs	App IX Metals	App IX Metals (Dissolved)	TPH DRO	TPH GRO	pH / Sample Info (Lab Use) Metals
1003212-01	67SB02-00	3/25/10	0815	SO	6					1	2	3	1	1		✓	1	
	67SB02-00MS				3					1	2	3						
	67SB02-00MSD				3					1	2	3						
	67SB02-00MS/MSD		0815		3								1	1		✓	1	
1003212-02	67SB02-01		0825		6					1	2	3	1	1		✓	1	
-03	67SB02-02	3/25/10	0840	SO	6					1	2	3	1	1		✓	1	
1003197-08*	67FB02	3/25/10	0740	O	10	5		1				3 (2)	2	1		2	2	<2

Received the following for VOC, SVOC, DRO, GRO & MTL:

67SB06-00	3/23/10	1350	1003212-04
67SB06-01	3/23/10	1255	-05
67SB06-01D	3/23/10	1355	-06
67SB06-05	3/23/10	1415	-07

Lab Use Only

Sample Unpacked By: Jennifer Doer
Sample Order Entry By: [signature] 3/26/10
Samples Received in Good Condition? Y or N
If no, explain: see comments

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

Comments

Residual Chlorine Present?
Yes ___ No ✓

*rec'd 1 VOC vial broken for 67FB02 JD 3/26/10

Sample Custody

Relinquished by: [signature]	Date/Time: 3/25/10 1500	Received by: Jennifer Doer	Date/Time: 3/26/10 0915
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or N If yes, where?
Custody Seal(s) intact? Y or N
On Ice? Y or N
Cooler Temp: 2.3, 2.4, 1.8 °C

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

White & Yellow copy to lab • Pink copy for customer

16065

40

Page 1 of 2

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CHAIN OF CUSTODY

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

Courier FedEx
Airbill No. 8617 8652 7877
Sampling Complete? Y or (N)

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? Y or (N) If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs (3-40ml / 2-Na2S2O3 / 1-MeOH)	App IX SVOCs (2-4L)	App IX Metals (PL / 1-4oz)	App IX Metals (Dissolved) (PL)	TPH DRO (2-4L)	TPH GRO (4oz)	pH / Sample Info (Lab Use) Metals
1003231-02	67SB04-00	3/25/10	1120	SO	6					1	2	3	1	1		✓	1	
1003231-01	67SB04-01		1125		6					1	2	3	1	1		✓	1	
	67SB04-01 MS		1125		3					1	2	3						
	67SB04-01 MSD		1125		3					1	2	3						
	67SB04-01 MS/MSD		1125		3								1	1		✓	1	
1003231-03	67SB04-03	3/25/10	1140	SO	6					1	2	3	1	1		✓	1	
1003197-13	67TB03	3/26/10		TB	5	5						3					2	
1003197-12	67ER05	3/26/10	1045	RI	10	5		1				3	2	1		2	2	<2
1003231-04	67SB03-00	3/26/10	0825	SO	6					1	2	3	1	1		✓	1	
-05	67SB03-01	3/26/10	0830	SO	6					1	2	3	1	1		✓	1	

Lab Use Only

Sample Unpacked By: Jennifer Doer
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

Residual Chlorine Present?
Yes ____ No ✓

Sample Custody

Relinquished by: [signature]	Date/Time: 3/26/10 1500	Received by: Joan Purdie	Date/Time: 3-27-10 1100
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or (N) If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 1.2, 1.2, 3.2 °C 0.8 °C

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

White & Yellow copy to lab • Pink copy for customer

SN0010

16064

41

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

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

Courier FedEx
Airbill No. 8617 8652 7877
Sampling Complete? Y or (N)

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? Y or (N) If yes, which ID(s)?

Requested Analysis (include method and bottle type)

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs (3-40ml / 2-Na2S2O3 1-MeOH)	App IX SVOCs (2-AL)	App IX Metals (4/2oz)	App IX Metals (Dissolved) PL	TPH DRO (2-AL)	TPH GRO (4-oz)	pH Metals	pH Diss. Metals
1003231-06	67SB03-04	3/26/10	0840	SO	6					1	2	3	1	1		✓	1		
1003197-10 1003198-02	67GW08	↓	↓	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-11 1003198-03	67GW08 D	↓	↓	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-10 1003198-02	67GW08 MS	↓	↓	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-10 1003198-02	67GW08 MSD	3/26/10	0840	GW	11	5		2				3	2	1	1	2	2	<2	<2

Lab Use Only

Sample Unpacked By: Jennifer Miller
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

~~Residual Chlorine Present?~~
Yes ____ No ✓

Sample Custody

Relinquished by:	Date/Time: 3-26-10 1500	Received by: Joan Purdie	Date/Time: 3-27-10 1100
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or (N) If yes, where? | Custody Seal(s) intact? Y or N | On Ice? (Y) or N | Cooler Temp: 1.2, 1.2, 3.2 °C

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

White & Yellow copy to lab • Pink copy for customer

0.8°C
SN0010 1.2

16063 AHG 3/29/10

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

Residual Chlorine Present? Yes ____ No ✓

CHAIN OF CUSTODY

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

Courier FedEx
Airbill No. 8685 9528 4732
Sampling Complete? Y or (N)

Client/Reporting Information

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

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? Y or (N) If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	App IX VOCs (3-40ml)	App IX SVOCs (2-AL)	App IX Metals (1-PL) HNO3	App IX Metals (Dissolved) (1-PL) HNO3	TPH DRO (2-AL)	TPH GRO (2-40ml)	pH / Sample Info (Lab Use): Total Metals	Diss. Metals
1003197-14 1003198-04	67GW07	3/26/10	1325	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-15 1003198-05	67GW05	3/27/10	1130	↓	11	5		2				3	2	1	1	2	2	<2	<2
1003197-16 1003198-06	67GW06	3/27/10	0940	↓	11	5		2				3	2	1	1	2	2	<2	<2
1003197-17 1003198-07	67GW01	3/27/10	1535	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-18	67ER06	3/27/10	1315	RI	10	5		1				3	2	1		2	2	<2	/
1003197-19 1003198-08	67GW02	3/28/10	0940	GW	11	5		2				3	2	1	1	2	2	<2	<2
	~~67GW08~~ ER07	~~3/26/10~~	~~1045~~	~~RI~~	~~10~~	~~5~~		~~1~~				~~3~~	~~2~~	~~1~~		~~2~~	~~2~~		
1003197-20 1003198-09	67GW04	3/28/10	1320	GW	11	5		2				3	2	1	1	2	2	<2	<2
1003197-22	67TB04	3/26/10		TB	5	5						3					2	/	/
1003197-21	67ER07	3/28/10	1045	RI	10	5		1				3	2	1		2	2	<2	/

KM 03-30-10 (2-AL)

AHG 3/29/10

Lab Use Only

Sample Unpacked By: K. Manning
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

*one AL for 67ER06 (SVOC) says 67FB03 on its label & written above it is: 67ER06; 67FB03 does not exist on COC

Sample Custody

Relinquished by:	Date/Time: 3-29-10 1500	Received by: K. Manning	Date/Time: 03-30-10 0900
Relinquished by:	Date/Time:	Received by:	Date/Time:

Subcontact? Y or (N) If yes, where?
Custody Seal(s) intact? (Y) or N
On Ice? (Y) or N
Cooler Temp: 1.2 °C

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

White & Yellow copy to lab • Pink copy for customer

SNC010

Residual Chlorine Present?
Yes ____ No ✓

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

SVOC + DRO in 1-8oz

16061

77

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 State Zip: Moon Twp., PA 15108
Project Contact: Mark Kimes
Phone #: 412-269-2009
Sampler's Name: A. Gailey/R. Roselius

Project Information

Project Name: SWMU 67
Sampling Location: Puerto Rico
Turnaround time: Standard
Batch QC or Project Specific? If Specific, which Sample ID?
Are aqueous samples field filtered for metals? (Y) or N
Are high concentrations expected? Y or (N)? If yes, which ID(s)?

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

CompuChem No (Lab Use)	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Sodium Bisulfate	App IX VOCs 40ml	App IX SVOCs	App IX Metals 1-2oz or 1 PL	App IX Metals (Dissolved) PL	TPH DRO	TPH GRO 2-40ml or 1-4oz					pH / Sample Info (Lab Use) TH Metal	Diss Metal			
1003231-07	67SS01	3/30/10	0920	SO	6					1	2	3	1	1		✓	1									
✓ -08	67SS02	↓	0950	SO	6					1	2	3	1	1		✓	1									
1003197-23	67ER08	↓	1005	RI	10	5		1				3	2	1		2	2					<2				
~~1003197-24~~ 1003198-10	67GW03	↓	1030	GW	11	5		2				3	2	1	1	2	2					<2	<2			
1003197-25	67TB05	3/30/10		TB	5	5						3					2									
	recorded by lab personnel																									
~~1003249-01~~ ~~1003249-02~~	67IDW01	3/30/10	1205	SO								TCLP VOA 3		TCLP metal 1		+RIC										
~~1003250-01~~ ~~1003250-02~~	67IDW02	3/30/10	1215	WA								1 AT		2 AT		+RIC										

Lab Use Only

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

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

Comments: DB 3/30/10 Rec'd ID: 67IDW02 - ~~2 SVOA (AL)~~ 1 VOA + 2 (AL) TCLP MHL
Rec'd ID: 67IDW01 2-2oz + 1-4oz TCLP VOA + 1-8oz TCLP Mtl Not listed on COC DB 3/31/10

Sample Custody

Relinquished by: [signature]	Date/Time: 3-30-10 1500	Received by: Diane Byrd	Date/Time: 3/31/10 1015
Relinquished by:	Date/Time:	Received by:	Date/Time:
Subcontact? Y or (N) If yes, where?	Custody Seal(s) intact? (Y) or N	On Ice? (Y) or N	Cooler Temp: 1.0, 4.1 °C

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

White & Yellow copy to lab • Pink copy for customer

SN0015

FedEx Express

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For FedEx services worldwide.

Sender's Copy

1 From *Please print and press hard.*

Date 01/24/14 Sender's FedEx Account Number 2336-3671-1

Sender's Name PATT MURPHY Phone 757-567-1553

Company CH2M HILL

Address NAVAL ACTIVITY PR

Address BLDG 2339

City Ceiba State/Province PR

Country USA ZIP/Postal Code 00735

2 To

Recipient's Name Jennifer Orin Phone 207 874-2400

Company KATAHDIN ANALYTICAL SERVICES

Address 95 HUTCHINS DR. Dept./Floor

Address

City PORTLAND State/Province ME

Country USA ZIP/Postal Code 04102

Recipient's Tax ID Number for Customs Purposes
e.g., GST/HST/QST/PST/VAT/EIN/ABN, or as locally required.

3 Shipment Information ☐ For EU Only: Tick here if goods are not in free circulation and provide C.I.

Total Packages (Shipper's Load and Count/SLAC) 1 Total Weight ____ ☐ lbs. ☐ kg DIM 1 x 1 ☐ in. ☐ cm

Commodity Description	Harmonized Code	Country of Manufacture	Value for Customs
ENV SAMPLES			$1,000

Has EEI been filed in AES? ☐ No EEI required, value $2,500 or less per Sch. B Number, no license required (NLR), not subject to ITAR. ☐ No EEI required, enter exemption number: ____ ☐ Yes – Enter AES proof of filing citation: ____

If other than NLR, enter License Exception: ____

Total Declared Value for Carriage ____

Total Value for Customs (Specify Currency) $1,000 USD

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5 Packaging *These unique brown boxes with special pricing are provided by FedEx for FedEx Intl. Priority only

☐ FedEx Envelope ☐ FedEx Pak ☐ FedEx Box ☐ FedEx Tube ☑ Other COOLER ☐ FedEx 10kg Box* ☐ FedEx 25kg Box*

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☐ Sender Acct. No. in Section 1 will be billed. ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check/Cheque (FedEx Use Only)

FedEx Acct. No.

Credit Card No.

Credit Card Exp. Date

Bill duties and taxes to: ALL shipments may be subject to Customs charges, which FedEx does not estimate prior to clearance. (Enter FedEx Acct. No. below.)

☑ Sender Acct. No. in Section 1 will be billed. ☐ Recipient ☐ Third Party

FedEx Acct. No. 233636741

8 Your Internal Billing Reference First 24 characters will appear on invoice.

475153.67.FI.FK

9 Required Signature

Use of this Air Waybill constitutes your agreement to the Conditions of Contract on the back of this Air Waybill, and you represent that this shipment does not require a U.S. State Department License or contain dangerous goods. Certain international treaties, including the Warsaw Convention, may apply to this shipment and limit our liability for damage, loss, or delay, as described in the Conditions of Contract. **WARNING:** These commodities, technology, or software were exported from the United States in accordance with Export Administration Regulations. Diversion contrary to U.S. law prohibited.

Sender's Signature

This is not authorization to deliver this shipment without a recipient signature.

For Completion Instructions, see back of fifth page.

568

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RETAIN THIS COPY FOR YOUR RECORDS.

07/12

CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 45684

Report to: PLEASE PRINT

Company Name: CH2M HILL Phone: 703-376-5301

Address: WDC

Fax: —

Attn: Mike Zambani

Invoice to: PLEASE PRINT

Company Name: See Contract Phone:

Address:

Fax:

Attn:

Project Name/Number: SWMU-67 475153.67.E.FK

Sampler (Print): Pat Murphy

Purchase Order Number: See Contract

Sampler (Signature):

Analysis Requested/Method Number: Metals Extended

Date Shipped: 1/24/14

Carrier: FED-EX

Waybill No.: [illegible]

Comments: [illegible]

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Matrix: Sed.	Matrix: Soil		Metals Extended	Comments
NAPR-W67-SB09-0507	SWMU-67	1/24/14	1100	AST	1			✓		1	
NAPR-W67-SB09-0507MS	SWMU-67	1/24/14	1100	AST	1			✓		1	
NAPR-W67-SB07-0507SD	SWMU-67	1/24/14	1100	AST	1			✓		1	
NAPR-W67-SB07P0507	SWMU-67	1/24/14	1110	AST	1			✓		1	
NAPR-W67-EB01-012414	SWMU-67	1/24/14	1130	AST	1	✓				1	HNO_3

Shuttle Temperature:

Turnaround Requested: Check one
☑ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Pat Murphy	1/24/14	1530					

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

See reverse side for Container Preservative and Sampling Information

ID	Lat N	Long E
SE - Pad #001	18.24104	-65.63483
NE - Pad #002	18.24109	-65.63483
NW - Pad #003	18.24108	-65.63496
SW - Pad #004	18.24104	-65.63499
Outflow - Start #005	18.24108	-65.63493
outflow - End #006	18.24117	-65.63493
Well Due N of outflow	18.24112	-65.63493
NE Grid #008	18.24112	-65.63486
NW Grid #009	18.24119	-65.63512
SW Grid #010011	18.24082	-65.63506
SE Grid #010	18.24085	-65.63478

0900 Start SB-09

NAPR + W67 - S1308 - 0507 1100

P 1110

E1301 - 01241 1130

SWMU 67 - RR - Ceiba, PR
Date: 01/21/2014
Field Team: P. Murphy, M. Barner } CH2M HILL
Obj: Geophysical Survey @ SWMU-67
Weather: ~83°F, Partly Cloudy

0700 Meet in hotel lobby. Go over and sign all H&S paperwork. Conduct H&S tailgate and sign PTSP.

0730 Go over the days plan/agenda. Depart for SWMU 67. Will stop on way to acquire ice.

0900 Have located and accessed SWMU-67 investigation area. Recon was required around veg. to access site. Access gained by walking through tennis courts and walking around the east side of tennis courts. Located Service Bay, Outfall, and several monitoring wells.

1000 Set-up and tune TW-6 (geophysical equipment) and begin investigation.

1130 P. Ruiz onsite

1200 P. Ruiz departs site

1/21/14

1300 Continue TW-6 investigation.

1600 End TW-6 survey. No indication UST is present. Area contains debris, some of which is metal (sheets of metal, fence/metal posts, etc.)
Pack-up equipment and depart site.

1/21/2014

1/22/14

SWMU 67 - RR - Ceiba, PR
Date: 01/22/2014
Field Team: P. Murphy, M Barner } CH2M HILL
Obj: SWMU-3 vent cap, Geophysical Survey @ SWMU-67
Weather: ~85°F, Partly Cloudy.

0700 Meet in hotel lobby. Conduct H&S tailgate and go over the day's plan.
0725 Depart for SWMU-3. Will get ice on the way.
0830 Arrive @ SWMU-3. P. Murphy walks to find PVC stick-ups.
0845 P. Ruiz onsite. PVC stick-ups found. All walk/~~to~~ mob to PVC stick-ups (x2) to install 6" vent screens. Will use PVC primer and PVC glue to install.
0945 Mob to SWMU-67. P. Ruiz offsite.
1005 Arrive @ SWMU-67. Will set-up GPR unit and veg. clear concrete pad to conduct GPR investigation.
1300 END GPR survey. M. Barner to upload survey data. No initial indication of tank under concrete pad

MM

1/22/14

~~1400~~
1500 ~~Have GPS area~~ Collect GPS on service bay, outfall, and investigation area (See pg. 5)
1600 Have determined outfall from service bay is the outflow pipe discharge source in northern ditch area.
END DAY

1/22/14

SWMU 67-RR-Ceiba, PR
Date: 01/23/2014
Field Team: P. Murphy, M. Dancis } CH2M HILL
Obj: Subsurface Sol Sampling
0700 Meet in hotel lobby. Go over H&S plan, Conduct H&S tailgate, review SOP and the day's agenda/plan
0745 Depart Hotel for SWMU-67. Will get ice enroute
0830 Arrive @ SWMU-67. Begin to carry hand-auger and other sample equipment into site.
0900 Begin hand-augering @ 67SB09.
1130 Have reached ~ 3.5 ft bgs. Area contains rocks and coral, making hand augering very difficult. Need to add additional pole to auger. Channel locks are not working to seperate pole and handle. Mob offsite to get tools.
1300 Back onsite. Continue hand-augering
1600 Have reached ~ 4 ft bgs @ SB09 and ~ 3.5 ft @ SB10. END DAY

SWMU 67-RR-Ceiba, PR
Date: 01/24/2014
Field Team P. Murphy, M. Dancis } CH2M HILL
Obj: Cont. Subsurface Sol Sampling
0700 Meet in hotel lobby. Conduct H&S tailgate
0730 Depart for SWMU-67
0815 Start Hand augering. Spoke with Mr L. Salsing last night and will focus on getting one sample.
~~1100~~ 1100 Collect NAPR-W67-SB09-0507
- Collect MS/MSD
1110 Collect NAPR-W67-SB09P-0507
1130 Collect NAPR-W67-EB01-012414
- NOTE. Collected all QA/QC @ SB09 as this was the only sample able to be collected. Total depth of sample taken was from 5 ft bgs to 5'3" bgs.
1200 Depart SWMU 67 to ship samples
END EVENT

Location: SWMU 67 Date: 7/2/14

Project / Client: NAPR / NAVY CLEAN

0710 ARRIVED @ CEIBA AIRPORT, PICKED UP FORD RANGER FROM LONG TERM/ MONTHLY PARKING.

OBJECTIVE FOR THE DAY:
MEET WITH GEOENVIROTECH (SUBCONTRACTOR), PERSONNEL: HARDY & WILLIAM. MOBILIZE TO SWMU 67, EXECUTE SITE WALK OVER, CLEAR VEGETATION FOR PATH TO PROPOSED SAMPLE LOCATIONS. (GEOPROBE ACCESS/RAG). PERFORM UTILITY CLEARANCE.

0800 WAITING AT THE ROOSEVELT "ROADS REDEVELOPMENT" ENTRANCE FOR GEOENVIROTECH.

0810 RECEIVE CALL FROM HARDY (JUST RELEASED FROM THE HOSPITAL, DUE TO BATTING KIDNEY STONES OVERNIGHT). HE INFORMED ME THAT HE WAS OBVIOUSLY NOT GOING TO MAKE IT TODAY, BUT HECTOR BABILONIA WOULD BE REPLACING HIM. HECTOR & WILLIAM ARE 10 MINUTES AWAY

0830 MEET HECTOR & WILLIAM AT

7/2/14

Location: SWMU 67 Date: 7/2/14

Project / Client: NAPR / NAVY CLEAN

THE AIRPORT ENTRANCE, MOBILIZE TO SWMU 67

0900 PERFORM H&S TAILGATE BRIEFING: REVIEW AHA FOR TASK(S) TO BE PERFORMED. PERSONNEL: R. FIELDS / CH2MHILL, WILLIAM RODRIGUEZ & HECTOR BABILONIA / GEOENVIROTECH. NOTE: MADE ADDITIONS TO THE EXISTING AHA (PER S. BRAND'S REQUEST) TO INCLUDE VEGETATION CLEARANCE HAZARDS & BIOLOGICAL HAZARDS.

0930 MARKED PROPOSED PATH TO EXISTING STRUCTURE, BEGIN CLEARING VEG.

1045 BREAK FOR LUNCH

1130 RESUME EFFORT

1330 PATH CLEARED, BEGIN UTILITY CLEARANCE (GPR).

1430 UTILITY CLEARANCE COMPLETE GEOENVIROTECH OFF SITE.

1435 R. FIELDS HEADED TO FEDEX TO PICK UP SAMPLE CONTAINERS.

1700 EOD - TRAVEL →

7/2/14

Location: SWMU 67 Date: 7/3/14
Project / Client: NAPR / NAVY CLEAN

0715 R. FIELDS ARRIVES @ CEIBA, PR. AIRPORT.
0800 MEET GEOENVIROTECH @ SWMU 67 GATE. SAME PERSONNEL AS YESTERDAY.
0815 H&S BRIEFING: TOPIC HYDRATION & PINCH POINTS (PERSONNEL: W. RODRIGUEZ & H. BABILONIA) NOTE: REVIEWED AHA
OBJECTIVE FOR THE DAY: COLLECT SUBSURFACE SOIL FROM 6 LOCATIONS IN THE VICINITY OF HISTORICAL LOCATION "67SB01". | DEMOBILIZED.
0830 BEGIN DPT EFFORT
0845 COLLECT SAMPLE: NAPR-W67-SB09R-0507
1-4oz JAR
SOIL DESCRIPTION: (ML) SILT W/SAND 10YR 5/4 (YELLOWISH BROWN), SILT WITH VERY FINE TO FINE SAND.
0850 SAMPLE NAPR-W67-SB09RP-0507
FIELD DUPLICATE.
0855 COLLECT SAMPLE: NAPR-W67-SB10-0507
SOIL DESCR: SILT W/SAND (ML) 10YR 5/6 (YELLOWISH BROWN), SILT WITH VERY FINE TO FINE GRAINED SAND.
7/3/14

Location: SWMU 67 Date: 7/3/14
Project / Client: NAPR / NAVY CLEAN

0905 COLLECT SAMPLE NAPR-W67-SB11-0507
SOIL DESCR: SILT W/SAND, 10YR 4/4 (DARK YELLOWISH BROWN), SILT WITH FINE TO MEDIUM GRAINED SAND.
0915 COLLECT SAMPLE: NAPR-W67-SB12-0507
SOIL DESCR: SILT W/SAND, 10YR 3/4 (DARK YELLOWISH BROWN), SILT WITH FINE TO MEDIUM GRAINED SAND.
0920 COLLECT SAMPLE: NAPR-W67-SB12-0709
SOIL DESCR: CLAY W/SAND (CL), 10YR 4/2 (DARK GRAYISH BROWN), CLAY WITH MEDIUM PLASTICITY W/ VERY FINE SAND.
0930 COLLECT SAMPLE: NAPR-W67-SB13-0507
SOIL DESCR: SILT WITH SAND (ML) 10YR 5/6 (YELLOWISH BROWN), SILT WITH VERY FINE TO FINE SAND.
0940 COLLECT SAMPLE: NAPR-W67-SB14-0507
+ MS/MSD. 3 - JARS 4oz.
SOIL DESCR: SILT W/SAND, 10YR 4/3 (BROWN), SILT WITH VERY FINE TO FINE SAND.
0955 SOIL SAMPLING COMPLETE. MOBILIZING RIG BACK TO TRAILER
7/3/14

24

Location SWMU 67 Date 7/3/14

Project / Client NAPR / NAVY CLEAN

1000 COLLECT EQUIPMENT BLANK
NAPR-W67-EB01-070314
BLANK COLLECTED FROM LINER
1-250 ml poly w/ HNO_3.
ALL SAMPLES TO BE ANALYZED
FOR COBALT ONLY SW846 6020A.

1130 ALL EQUIPMENT PICKED UP.
SITE SECURE. GEOENVIROTECH
OFF SITE. R. FIELDS OFF SITE
HEADED TO FEDEX.

1265 STOP FOR LUNCH, CALL L SAKSVIG
TO PROVIDE UPDATE. PER OUR
CONVERSATION WE WILL HOLD ONTO
THE SAMPLE UNTIL 7/7/14 TO
SHIP FROM VQS TO LAB DUE TO
HOLIDAY WEEKEND.

1230 END OF DAY IN THE FIELD

7/3/14

7/3/14

25

Location Date

Project / Client

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page ____ of ____

Client	Contact	Phone #	Fax #
CH2M HILL	MIKE ZAMBONI	(703) 376 5301	( )

Address | City | State | Zip Code

Purchase Order # | Proj. Name / No. SWMU 67 / 492993.71.PL.FK | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) RONNY FIELDS / [signature] | Copies To:

LAB USE ONLY WORK ORDER #:

KATAHDIN PROJECT NUMBER _____

REMARKS: _____

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO: _____

TEMP°C _____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs	SW-846 6020A (COBALT ONLY)	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	NAPR-W67-SB09R-0507	7/3/14 / 0845	SOIL	1	X										
	NAPR-W67-SB09RP-0507	7/3/14 / 0850	SOIL	1	X										
	NAPR-W67-SB10-0507	7/3/14 / 0855	SOIL	1	X										
	NAPR-W67-SB11-0507	7/3/14 / 0905	SOIL	1	X										
	NAPR-W67-SB12-0507	7/3/14 / 0915	SOIL	1	X										
	NAPR-W67-SB12-0709	7/3/14 / 0920	SOIL	1	X										
	NAPR-W67-SB13-0507	7/3/14 / 0930	SOIL	1	X										
	NAPR-W67-SB14-0507	7/3/14 / 0940	SOIL	1	X										
	NAPR-W67-SB14-0507MS	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE)									
	NAPR-W67-SB14-0507SD	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE DUPLICATE)									
	NAPR-W67-EB02-0703314	7/3/14 / 1000	QC	1	X	(EQUIPMENT BLANK)									
		/													
		/													
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

ORIGINAL

KAS-COC1

69
70
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39 40 41 42 43 44 45 46 47 49 50 51

Appendix B
Wetland Delineation Report

DRAFT

WETLAND DELINEATION REPORT
SWMU 67 – FORMER GAS STATION

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

OCTOBER 29, 2010

Prepared for:

DEPARTMENT OF THE NAVY
NAVFAC SOUTHEAST
North Charleston, SC

Under:

Contract No. N62470-10-D-3000
DELIVERY ORDER JM01

Prepared by:

MICHAEL BAKER JR., INC.
Moon Township, Pennsylvania

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

Signature: _____

Name: _____

Title: _____

Date: _____

TABLE OF CONTENTS

Page

LIST OF ACRONYMS iv

1.0 PROJECT DESCRIPTION 1-1

2.0 WETLAND FINDINGS 2-1
2.1 Introduction 2-1
2.2 Methodology 2-2
2.3 Results 2-4
2.4 Summary 2-4

3.0 REFERENCES 3-1

LIST OF TABLES

Table 1 - Plant Indicator Status Categories
Table 2 - Wetland Resources

LIST OF FIGURES

Figure 1 – Project Location Map
Figure 2 – Aquatic Resources and Photo Location Map

LIST OF APPENDICES

Appendix A – Wetland Determination Data Forms
Appendix B – Photographs
Appendix C – National Wetlands Inventory (NWI) map and USDA Web Soil Survey Data

LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code for Federal Regulations
DGPS	Differential Global Positioning System
EPA	Environmental Protection Agency
GIS	Geographic Information System
GPS	Global Positioning System
NWI	National Wetland Inventory
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

1.0 PROJECT DESCRIPTION

On May 13, 2008, the Environmental Protection Agency (EPA) approved the Final Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Solid Waste Management Unit (SWMU) 67 dated December 20, 2007. The work plan was developed in order to obtain the data to further characterize the impacts to the environment due to past operations at SWMU 67.

SWMU 67 is approximately 2.5 acres in size and includes a small parking area and tennis court. The tennis court is surrounded by secondary growth vegetation to the north, east, and south. Langley Drive abuts the SWMU to the west. The entire SWMU is relatively flat, with elevation increasing slightly south of the SWMU (see Figure 1).

An initial field inspection of the wetland boundary in the vicinity of SWMU 67 was conducted on March 22, 2010, while locating proposed environmental sampling points. A field delineation of the wetland boundary was deemed necessary after the field team noted discrepancies in the December 1999 delineation by GeoMarine.

The previous delineation by GeoMarine identified one unit, E2SS3 (estuarine, intertidal, scrub-shrub, broad-leaved evergreen) with the boundary approximately 250 feet northeast of the SWMU boundary. The result of the 2010 field delineation identified an E2FO3 (estuarine, intertidal, forested, broad-leaved evergreen) wetland resource immediately adjacent to SWMU 67 (with a very small portion [0.01 acre] located within the SWMU boundary). Prior to entering the field, the E2FO3 area was originally considered upland habitat. The 2010 field delineation (E2FO3) and the E2SS3 boundaries can be referenced on Figure 2, with each community type being depicted for comparison purposes. The E2SS3 community type was not verified during the 2010 field delineation, as the objective of the field delineation was to identify and revise the wetland resource boundary (and identify the associated community type) as it relates to SWMU 67.

On March 24 and May 25, 2010, Adam Gailey; Environmental Scientist of Michael Baker Jr., Inc., field delineated the jurisdictional wetland boundary. Mr. Gailey has 7 years of wetland delineation experience and is a Certified Wetland Delineator (2003) by the Institute for Wetland & Environmental Education & Research. Site reconnaissance revealed that one forested estuarine wetland exists within the northeast confines of SWMU 67.

Jurisdictional wetlands were delineated according to the U.S. Army Corps of Engineers *Wetlands Delineation Manual* (Manual), (Environmental Laboratory, 1987), and the U.S. Army Corps of Engineers Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Caribbean Islands Region (Environmental Laboratory, 2009). Wetland findings and a description of how the wetlands were identified and delineated are presented in the following sections.

Although no other natural aquatic resource features (i.e., wetlands, streams, or ditches) were identified during the field delineation; upgradient (or roadway) runoff along the eastern side of Langley Drive is conveyed through SWMU 67. A set of culverts; one on each side of the small parking area divert runoff below ground. The culvert located on the northwestern portion of the SWMU outlets to an earthen drainage feature (see Appendix B - photo # 6). This feature is approximately 165 linear feet and transports precipitation runoff in a northern direction. However, beyond 165 feet, the characteristics of the drainage feature terminate (see Figure 2). This feature does not appear to provide a surface water connection to any other resource (stream, wetland, or ditch) adjacent to SWMU 67. Vegetative species such as white lead tree (*Leucaena*

leucocephala), white indigo berry *(Randia aculeate*, and guinea grass (*Urochloa maxima*) were observed adjacent to and within this drainage feature.

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

Hydrology within the upper reaches of the wetland (east of Langley Drive and north of SWMU 67) is supplied by upland runoff via a large (36") culvert (see Photo #5). Although the upper reaches are supplied by a freshwater source; the majority of the wetland (downgradient) receives tidal influence due to the close proximity to Ensenada Honda. Therefore, the system as a whole will be referred to as estuarine.

2.0 WETLAND FINDINGS

2.1 Introduction

The term "Waters of the United States" has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites [United States Army Corps of Engineers (USACE) (33 Code of Federal Regulations (CFR) 328.3)]. The definition includes:

- The territorial seas with respect to the discharge of fill material.
- Coastal and inland waters, lakes, rivers, and streams that are navigable “Waters of the United States”, including their adjacent wetlands.
- Tributaries to navigable “Waters of the United States”, including adjacent wetlands.
- Interstate waters and their tributaries, including adjacent wetlands.
- All other “Waters of the United States” not identified above, such as: isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable “Waters of the United States”, the degradation or destruction of which could affect interstate commerce.

Wetland environs are described by the USACE (33 CFR 328.3) and the EPA (40 CFR 230.3) and jointly defined as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetland vegetation is defined as "macrophytic plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Federal Interagency Committee for Wetland Delineation, 1989). Hydrophytic species generally have physiological adaptations and the ability to grow, compete effectively, and/or persist in anaerobic soil conditions.

The U.S. Fish and Wildlife Service categorize species according to their probability of occurring in wetlands. The categories and their definitions are presented in Table 1. At each potential wetland on the site, vegetation was identified and a vegetation species list was completed. The dominant species in each plant community were assigned a wetland indicator status according to the *National List of Vascular Plant Species That Occur in Wetlands* (USFWS, 1996).

TABLE 1
Plant Indicator Status Categories

Indicator Category	Indicator Symbol	Definition
Obligate Wetland Plants	OBL	Plants that occur almost always (99% of the time) in wetlands under natural conditions, but which may also occur rarely (<1%) in nonwetlands.
Facultative Wetland Plants	FACW	Plants that occur usually (67-99%) in wetlands, but also occur (1-33%) in nonwetlands.
Facultative Plants	FAC	Plants with a similar likelihood (33-67%) of occurring in both wetlands and nonwetlands.
Facultative Upland Plants	FACU	Plants that occur sometimes (1-33%) in wetlands, but occur more often (67%-99%) in nonwetlands.
Obligate Upland Plants	UPL	Plants that occur rarely (<1%) in wetlands, but occur almost always (>99%) in nonwetlands under natural conditions.
No Indicator	NI	Species for which insufficient information was available to determine an indicator status.
No Agreement	NA	Species for which a unanimous decision was not achieved for indicator status.

Note: A "+" sign following an indicator status (e.g., FACW+) means that the species generally has a greater estimated probability of occurring in wetlands than species having the general indicator status, but a lesser estimated probability of occurring in wetlands than those having the next highest general indicator. A "-" sign following an indicator status means that the species generally has a lesser estimated probability of occurring in wetlands than species having the general indicator status, but a greater estimated probability of occurring in wetlands than those having the next lowest general indicator.

2.2 Methodology

A routine on-site determination was used, which subjects the site to the three-parameter wetland test. These tests require review of the vegetative community, soil conditions, and hydrologic indicators.

Sample points (set within a basic transect) were chosen to best represent the characteristics of each terrestrial community within the study area. These sample points are shown on the Aquatic Resources and Photo Location Map (Figure 2). A wetland determination "data form" was completed for these points and can be found in Appendix A. Those areas that did not exhibit the three characteristics of a wetland were considered upland (non-wetland). Wetlands were classified in accordance with the USFWS' *Classification of Wetlands and Deep Water Habitats in the United States* (Cowardin, et al., 1979). Adjacent non-wetland (i.e., upland) areas were examined for the purposes of comparison.

In general, according to Cowardin, et al., estuarine wetland systems consist of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean and in which ocean water is at least occasionally diluted by freshwater runoff from the land.

At SWMU 67, the estuarine wetland system was then further classified by the general appearance of the habitat. The following descriptions are the subclasses that were encountered during the site visits:

- Estuarine intertidal forested (E2FO) wetlands include areas where the substrate is exposed and flooded by tides; and dominated by woody vegetation that is 6.0 meters (20 feet) tall or taller.

Prior to conducting the sampling investigation at SWMU 67, the SWMU was located on USGS mapping (Naguabo, PR 7.5 minute Quadrangle, photo revised 1982) and evaluated for topographic relief, drainage patterns, and subwatershed characteristics (see Figure 1). Streams, tributaries, and other water bodies located within the project area were identified. The United States Fish and Wildlife Service's NWI map was reviewed for previously inventoried wetlands. The United States Department of Agriculture (USDA) Soil Conservation Service's *Web Soil Survey of Humacao Area, Puerto Rico Eastern Part* was used to determine soil drainage classification in the study area. Those soils classified as having poorly or very poorly-drained conditions may suggest wetland areas. The Web Soil Survey also served as a source of hydrological data. Potential wetland areas identified by any of these sources were recorded for a detailed field evaluation and can also be referenced in Appendix C. Synthesis of these sources indicated the highest potential for wetlands to occur east of SWMU 67.

The Humacao Area, Puerto Rico Eastern Part Soils Survey lists the SWMU soils as DeE2 – Descalabrado clay loam, 20 to 40 percent slopes, eroded, JaC2 – Jacana clay, 5 to 12 percent slopes, eroded, and Md – Made land. All three map units are listed as "not hydric". However, based on the physical soil properties documented during the delineation (see Appendix B) hydric soils were confirmed within the delineated wetland boundary (part of the Md – Made land soil map unit).

As noted in Section I, one previously mapped wetland area is located within the study area. However, the wetland resource boundary previously depicted was delineated by Geo-marine, Inc. in December 1999 from 1993 color infrared and 1998 true color photography. As such, it was determined that the E2SS3 wetland boundary did not represent a field delineated jurisdictional boundary and that the wetland community type (scrub-shrub) would need to be verified.

Fieldwork concentrated on field delineating the entire wetland boundary on site, and a portion of the wetland boundary adjacent to SWMU 67. Boundary delineation was accomplished by using a small shovel to take soil samples at areas along the wetland's edge, which supported facultative plant species. Obvious changes in topography and hydrology were used to locate these sampling areas. The soil, to a maximum depth of 46 centimeters (18 inches), was then examined for wetland characteristics (mottles and/or low matrix chroma, gleying, iron and manganese concretions). Soil samples (colors) were then compared to the Munsell Soil Color Charts (1994) for categorization. Hydrologic indicators were also examined. Depending on the results of the soil sample, additional samples were taken either closer to the wetland or upland until the boundary was determined. The wetland boundaries were identified and marked with plastic "wetland delineation" survey tape and each flag numbered sequentially for ease of surveying. For the purposes of mapping, the wetland boundary was further identified through the use of mapping grade differential global positioning system (DGPS). A Global Positioning System (GPS) receiver was used in conjunction with its companion geographic information system (GIS) data collector (Trimble Recon). The DGPS (satellite DGPS corrections from Omnistar or "real-time") field data was post-processed for maximum accuracy, entered into a GIS, and overlain on digital basemapping. Wetland boundaries are shown on the Aquatic Resources and Photo Location Map (Figure 2). Photographs of the aquatic resources/features identified on site are available in Appendix B.

2.3 Results

This section of the report characterizes the aquatic resources within the proposed project site. A description of the palustrine wetlands and stream channels encountered is provided below and shown on the Aquatic Resources and Photo Location Map (Figure 2). A Wetland Determination Data Form was completed in field designated emergent, forested, and upland community areas. Wetland Determination Data Forms are presented in Appendix B. Table 2 identifies the only identified and delineated palustrine wetlands, while Table 3 identifies the ephemeral, intermittent and perennial unnamed tributaries located on site.

TABLE 2
Wetland Resources

Wetland Sample ID	Classification	Hydrology	Total Area (acres within SWMU 67)
52510-EFO-2	E2FO3	Non-Isolated (groundwater and tidal influences)	0.01
52510-UPL-1	UPL	None	NA
52510-UPL-2	UPL	None	NA
TOTAL			**0.01**

Sample point 52510-EFO-2 was taken within the estuarine forested portion of the resource northeast of the SWMU. This area receives most of its hydrology from a high water table, and infrequent flooding (tidal influence). The primary hydrologic indicators (see Appendix A) were noted as a high water table (A2), soil saturation (A3), water-stained leaves (B9), oxidized rhizospheres on living roots (C3), and fiddler crab burrows (C10). The dominant herbaceous and woody vegetative species identified included black mangrove (*Avicennia germinans*), Puerto Rico royal palm (*Roystonea borinquena*), and golden leather fern (*Acrostichum aureum*). 100 percent of these species are hydrophytic (i.e., plants that grow in wet or oxygen depleted soil conditions). The soil profile from 0 to 10 inches exhibited a color at 10YR 3/1, and from 10 to 18 inches 7.5YR 4/0, and no mottles features. This indicates the presence of hydric soils and anaerobic activity. The wetland boundary was surveyed with the GPS and entered into the GIS for analysis.

Hydrology within the upper reaches of the wetland (east of Langley Drive and north of SWMU 67) is supplied via a large (36”) culvert (see Photo #5). Although the upper reaches are supplied by a freshwater source; the majority of the wetland (downgradient) receives tidal influence due to the close proximity to Ensenada Honda. Therefore, the system as a whole has been referred to as estuarine.

2.4 Summary

On February 23, 2010, the jurisdictional wetland boundary associated with SWMU 67 was field delineated which revealed one estuarine intertidal forested (E2F03) wetland system exists within the confines of SWMU 67. 0.01 acre of jurisdictional wetland is contained within the SWMU 67 boundary. In addition, one earthen drainage feature (approximately 165 linear feet) was also identified. However, this feature does not contribute to the hydrology of the adjacent forested estuarine wetland.

3.0 REFERENCES

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FIGURES

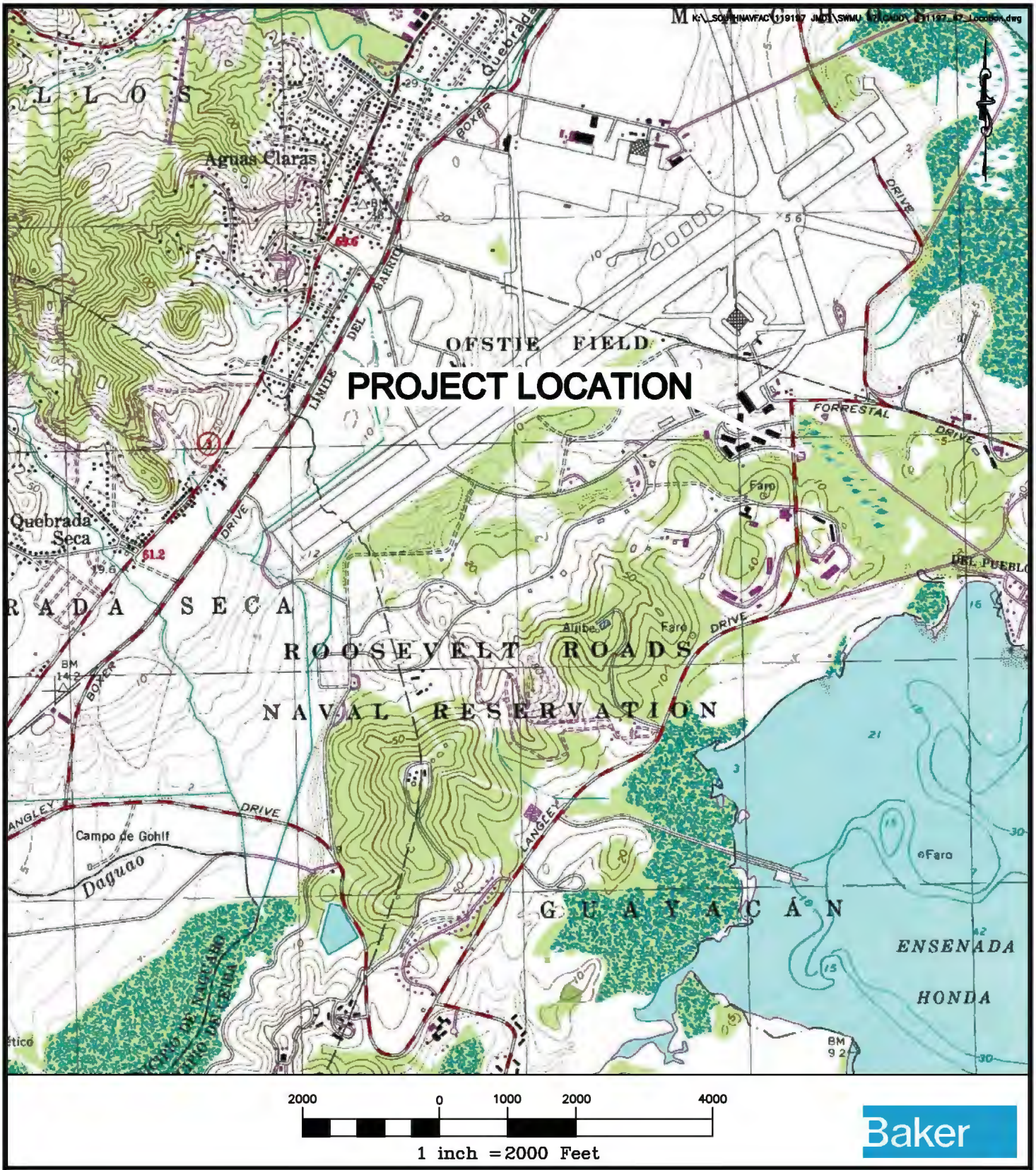


FIGURE 1
PROJECT LOCATION MAP
SWMU 67–FORMER GAS STATION
WETLAND DELINEATION REPORT

SOURCE: METRODATA, INC., 1999.

NAVAL ACTIVITY PUERTO RICO

100 0 50 100
1 inch = 100 ft.

SOURCE: USGS, NOV, 2006.

Baker

LEGEND

- EARTHEN DRAINAGE FEATURE
- SWMU BOUNDARY
- DITCH
- 24" STORM SEWER AND SIZE
- INLET
- ESTUARINE WETLAND BOUNDARY
- ESTUARINE WETLAND IDENTIFICATION
- 2010 FIELD DELINEATED WETLAND BOUNDARY
- EXISTING SOIL SAMPLING LOCATION
- PHOTO LOCATION AND DIRECTION

FIGURE 2
AQUATIC RESOURCES AND PHOTO LOCATION MAP
SWMU 67–FORMER GAS STATION
WETLAND DELINEATION REPORT

NAVAL ACTIVITY PUERTO RICO

APPENDIX A
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - Sumu 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: 52570 - EFO - 1

Investigator(s): A. Gailey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Lat: 804937.042 Long: 933297.844 Datum: NAD 83

Soil Map Unit Name: Md - Made LAND NWI classification: E2FO3

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____
Hydric Soil Present?	Yes X	No _____
Wetland Hydrology Present?	Yes X	No _____

Is the Sampled Area within a Wetland? Yes X No _____

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Avicennia germinans	40	Yes	OBL
2. Acrostichum aureum	40	Yes	OBL
3. Rotstonea boringuena	20	Yes	FAC
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Dominant - wetland vegetative species present.

SOIL

Sampling Point: 52510-EFO-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/1						Silty clay/loam	Saturated
10 - 18	7.5YR 4/0						Silty Clay	Saturated.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- X Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks: Saturated - hydric soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- X Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): NA

Water Table Present? Yes X No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0 - 18"

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: In addition to a shallow water table - Hydrology within the upper/headwater reaches of this resource are supplied via a concrete culvert outlet. It is assumed that downgradient portions of this resource receive tidal influence.

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - SWMU 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: 52510-UPL-1

Investigator(s): A. Gailey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 5-12 %

Lat: 804904.060 Long: 933258.844 Datum: NAD 83

Soil Map Unit Name: JaC2 - Jacana Clay, 5-12% slopes, eroded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Urochloa Maxima	60	Yes	FACU*
2. Samyda dodecandra	40	Yes	NA
3.			
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: Upland species identified at this location.

52510-UPL-1

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/4						clay loam	gravel/stones throughout.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Hydric Soils NOT Present. Refusal beyond 8" at this location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): —

Water Table Present? Yes _____ No X Depth (inches): —

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): —

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland Hydrology NOT Present. Upland area.

WETLAND DETERMINATION DATA FORM – Caribbean Islands Region

Project/Site: NAPR - SWMU 67 Municipality/Town: Ceiba Sampling Date: 5-25-10

Applicant/Owner: U.S. NAVY PR or USVI: PR Sampling Point: 52510 - UP2 - 2

Investigator(s): A. Gainey Ward/Estate: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Lat: 805007.726 Long: 933308.798 Datum: NAD 83

Soil Map Unit Name: Md - Made Land. NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No _____	Is the Sampled Area within a Wetland? Yes _____ No X
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Erythroxylum sp.	60	yes	NA
2. Pitophorum pterocarpum	40	yes	NA
3.			
4.			
5.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

52510-UPL-2

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2		—				clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Organic Bodies (A6)
- ___ 5 cm Mucky Mineral (A7)
- ___ Muck Presence (A8)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Stratified Layers (A5)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Upland Sample Point - hydric soils NOT Present. Refusal beyond 10".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Fiddler Crab Burrows (C10)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): —

Water Table Present? Yes _____ No X Depth (inches): —

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): —

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: wetland hydrology NOT Present - upland sample location.

APPENDIX B
PHOTOS

Photo 1. E2FO3 wetland – dominant species:
Acrostichum aureum and *Avicennia germinans*. View looking east

Photo 2. Estuarine wetland sample point location: 52510-EFO-1
View looking east

Photo 3. Estuarine wetland sample point location: 52510-EFO-1.
Evidence of saturation and a high groundwater table.

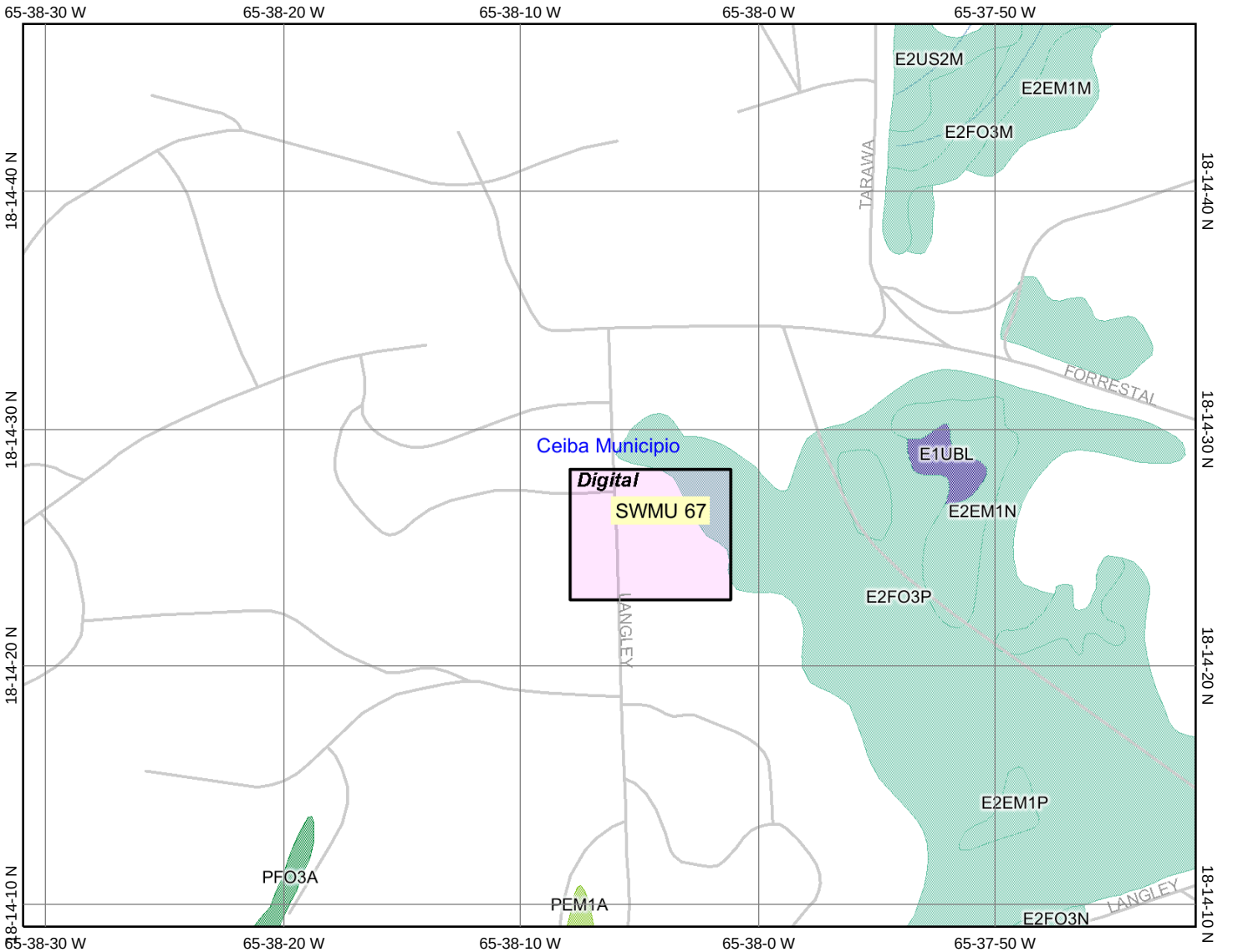
Photo 4. Boundary delineation flagging: "WETLAND DELINEATION"
View looking northeast

Photo 5. 36-inch Culvert outlet – freshwater hydrologic source (East of Langley Drive, and north of SWMU 67). View looking west

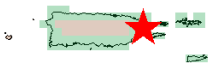
Photo 6. Earthen drainage feature - no surface connection with E2FO3 resource. View looking north

APPENDIX C
NATIONAL WETLANDS INVENTORY (NWI) MAP AND USDA SOIL SURVEY DATA

SWMU 67 - Phase I RFI



Map center: 18° 14' 28.0" N, 65° 38' 6.2" W



Legend

Major Roads

- Other Road
- Interstate
- State highway
- US highway

Roads

PRVI Cities

PRVI Wetland Polygons

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

PRVI Available Wetland Data

- Non-Digital
- Digital
- No Data
- Scan

Waterbodies 2M

Streams 2M

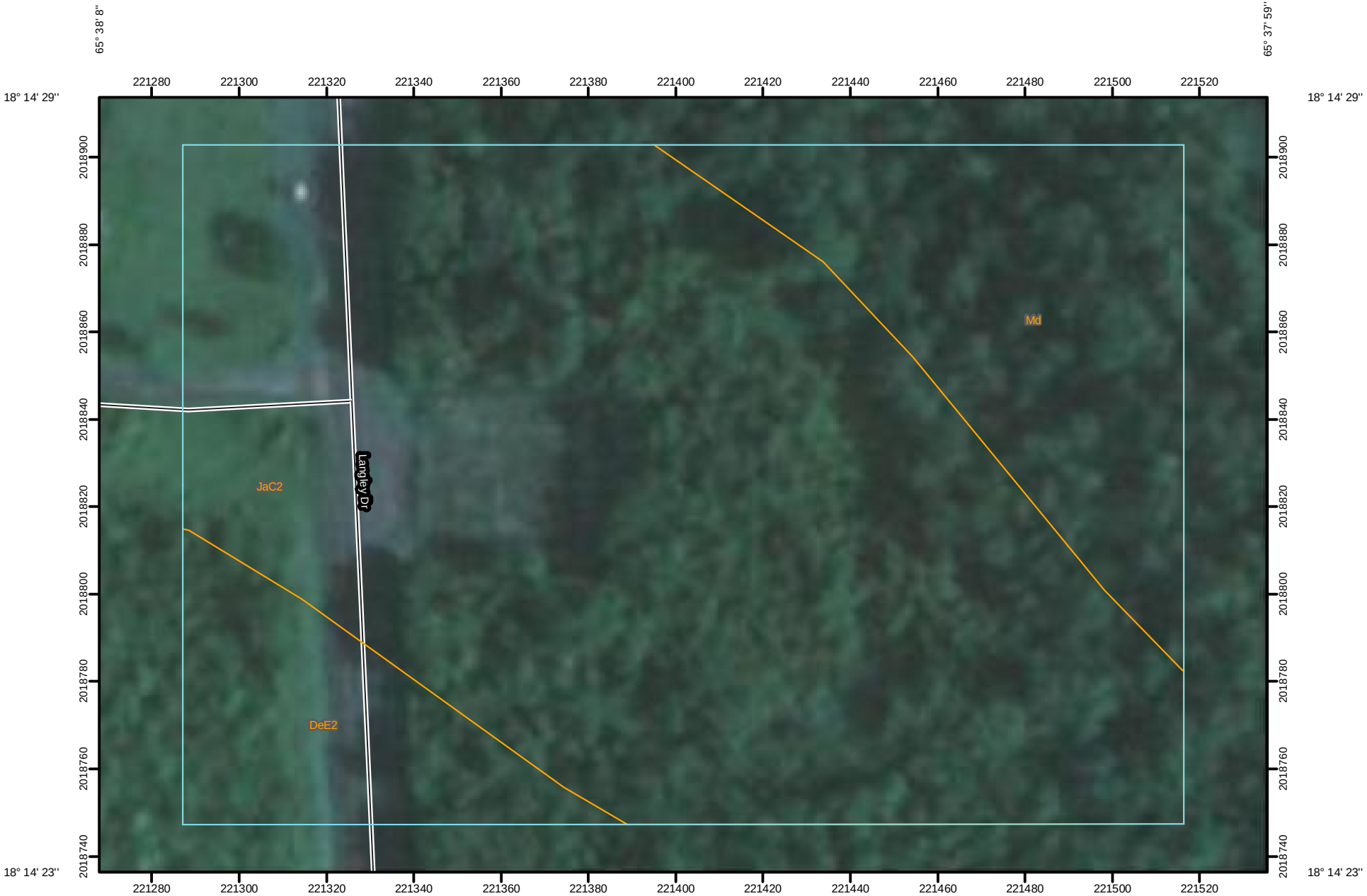
PRVI Counties 2M

N

Scale: 1:8,223

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Soil Map—Humacao Area, Puerto Rico Eastern Part
(SWMU 67)



Map Scale: 1:1,270 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Cities

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:1,270 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 20N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Date(s) aerial images were photographed: 2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Humacao Area, Puerto Rico Eastern Part (PR689)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
DeE2	Descalabrado clay loam, 20 to 40 percent slopes, eroded	0.9	9.8%
JaC2	Jacana clay, 5 to 12 percent slopes, eroded	6.3	71.6%
Md	Made land	1.6	18.6%
Totals for Area of Interest		**8.8**	**100.0%**

Humacao Area, Puerto Rico Eastern Part

DeE2—Descalabrado clay loam, 20 to 40 percent slopes, eroded

Map Unit Setting

Elevation: 30 to 710 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 77 to 81 degrees F
Frost-free period: 365 days

Map Unit Composition

Descalabrado and similar soils: 100 percent

Description of Descalabrado

Setting

Landform: Hillslopes, mountain slopes, ridges, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountainflank, mountaintop, head slope, crest, side slope
Down-slope shape: Convex, concave
Across-slope shape: Convex, concave
Parent material: Residuum and colluvium

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: Very low (about 2.2 inches)

Interpretive groups

Land capability (nonirrigated): 7s

Typical profile

0 to 6 inches: Clay loam
6 to 19 inches: Gravelly clay
19 to 23 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Humacao Area, Puerto Rico Eastern Part

JaC2—Jacana clay, 5 to 12 percent slopes, eroded

Map Unit Setting

Elevation: 20 to 250 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 79 to 81 degrees F
Frost-free period: 365 days

Map Unit Composition

Jacana and similar soils: 100 percent

Description of Jacana

Setting

Landform: Hillslopes
Landform position (two-dimensional): Toeslope, footslope, backslope, shoulder, summit
Landform position (three-dimensional): Base slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Weathered materials

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 4c

Typical profile

0 to 5 inches: Clay
5 to 21 inches: Clay
21 to 26 inches: Clay loam
26 to 30 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Humacao Area, Puerto Rico Eastern Part

Md—Made land

Map Unit Composition

Made land: 100 percent

Data Source Information

Soil Survey Area: Humacao Area, Puerto Rico Eastern Part
Survey Area Data: Version 3, Aug 19, 2008

Appendix C
Chromium Memorandum

Chromium Speciation on Vieques Island, Puerto Rico

Chromium occurs ubiquitously in nature; the most important mineral deposit being in the form of chromite ($FeOCr_2O_3$) which, however, is rarely pure. Almost all the sources of chromium in the earth's crust (e.g., chromite) are in the trivalent state. Chromium deposits in the hexavalent oxidation state (crocoite $PbCrO_4$) have been described. However, these occurrences are rare, small in quantity, and isolated to highly mineralized terrains which are not found on Vieques, based on the geology (discussed below). Living matter does not produce the energy necessary to oxidize trivalent to hexavalent chromium in the organism; therefore, it can be stated that nearly all hexavalent chromium in the environment is produced by human activities. It is derived from the industrial oxidation of mined chromium deposits, chromate pigments in dyes, paints, and plastics, metal surface and protective coatings, corrosion inhibitors, and possibly from the combustion of fossil fuels, wood, paper, etc. In this oxidation state, chromium is relatively stable in air and pure water, but it is reduced to the trivalent state when it comes into contact with organic matter in biota, soil, and water (ATSDR, 2008; WHO, 1988).

Chromite is a mafic mineral, which is a class of ferro-magnesium silicates and oxides that have mantle origins. Most mafic minerals are dark in color and the relative density is greater than 3 (chromite's relative density is 4.5 – 4.8). Common igneous rock-forming mafic minerals include the silicates: olivine, pyroxene, amphibole, and biotite. Igneous rocks may be classified in a continuum by the silica and mafic mineral content. Mafic igneous rocks, which are at one end of the spectrum, are by definition silica deficient (<52%) and have a mantle origin (i.e., oceanic crust). Common mafic rocks include basalt and gabbro. Ultramafic rocks are even more silica deficient (<45%) and are only found in the deep oceanic crust and slivers of deep oceanic crust, called Ophiolites, caught between continental crust during ocean basin closure; ultramafic rocks weather to form serpentine rocks. Granites, which typically have a lighter color and hence lower mafic mineral content (i.e., chromite), have the highest silica content (>69%) and are isolated to continental crust. Igneous rocks with lower mafic content are generally referred to as "felsic", which is the other end member to the ultramafic rocks. The concentration of chromium in rocks varies from an average of 5 mg/kg (range of 2 - 60 mg/kg) in granitic rocks (i.e., felsic), to an average 1800 mg/kg (range, 1100 - 3400 mg/kg) in ultramafic and serpentine rocks (US NAS, 1974). Intermediate igneous rocks, such as those found on Vieques, have a range of chromium concentrations slightly higher than the granitic range because of the slightly greater mafic mineral content.

Soil and sediment forming processes (e.g., weathering) may either enrich or deplete the resulting soil in chromium relative to the parent igneous material. For example, sediment transport can segregate the parent igneous mineral physically by density. Owing to their high density, mafic minerals may often be deposited and concentrated in higher energy environments. The weathering of rocks produces chromium complexes that are exclusively in the trivalent state (except in rare places where natural hexavalent mineralization occurs; however, natural geologic and environmental conditions on Vieques would not support this).

In most soils, chromium occurs in low concentrations; an average of 863 soil samples from the U.S. contained 53 mg/kg (Shacklette et al., 1970), but higher values are observed in weathered volcanic and igneous terrains. However, low chromium concentrations (10 - 40 mg/kg) have been detected in soils derived from granite or sandstone (Swaine & Mitchell, 1960), whereas soils derived from the weathering of intermediate igneous rocks, such as those found on Vieques (see below), have a range of chromium concentrations between 5.4 – 710 mg/kg (i.e., Berrow and Reaves, 1986).

The island of Vieques was formed from volcanic and other igneous rock. The island bedrock is mostly granodiorite, quartz diorite, and some lavas. Diorites and granodiorites are intermediate to intermediate-felsic igneous rocks, respectively, which means they have a mafic mineral (i.e., chromite) and silica (52 – 69%) content that is intermediate between the granitic and ultramafic end members. Because of the weathering of the bedrock, gravel, sands, and finer particles wash downhill during storms. Over the years this material has gathered in valleys near the ocean, forming alluvial, floodplain, terrace, and piedmont fan deposits. These sedimentary deposits generally consist of a mixture of gravel, sand, silt, and clay, which originated from weathering of adjacent plutonic rocks, largely granodiorites in this area. The range of chromium concentrations found on Vieques (0.23 mg/kg – 206 mg/kg, average of 19.23 mg/kg; one anomalously high value of 2,320 mg/kg was excluded from the data set as it is believed to be from non-natural sources, see SMWU1 chromium write-up for further details) is largely within the expected natural range for soil and sediment derived from intermediate igneous (i.e., granodiorite) terrain (i.e., 5.4 – 710 mg/kg); samples out of this range are discussed in individual documents related to those specific occurrences.

Solubility

The solubility of chromium compounds varies, depending primarily on the oxidation state. Trivalent chromium compounds, with the exception of acetate, hexahydrate of chloride, and nitrate salts, are generally insoluble in water. The zinc and lead salts of chromic acid are practically insoluble in cold water. The alkaline metal salts (e.g., calcium, strontium) of chromic acid are less soluble in water. Some hexavalent compounds, such as chromium(VI) oxide (or chromic acid), and the ammonium and alkali metal salts (e.g., sodium and potassium) of chromic acid are readily soluble in water. The hexavalent chromium compounds are reduced to the trivalent form in the presence of oxidizable organic matter. On Vieques, the chromium is most likely to be predominantly trivalent chromium present as the mineral chromite; in this state, chromium is highly immobile. Twenty-five soil samples collected from AOC I were analyzed for hexavalent and total chromium; hexavalent chromium was found to account for approximately one percent of the total chromium present in most samples. Moreover, the presence of organic matter in the soil (see below) would limit the migration of any hexavalent chromium where present.

Mobility in Soil

The mobility of chromium in soil is dependent upon the speciation of chromium, which is a function of redox potential and the pH of the soil. In most soils, chromium will be present predominantly in the chromium (III) oxidation state. This form has very low solubility and low reactivity, resulting in low mobility in the environment. Under oxidizing conditions, chromium (VI) may be present in soil impacted by anthropogenic industrial activities as $CrO4^{-2}$ and

$HCrO_4$. In these forms, chromium is relatively soluble and mobile. However, in general, chromium is not very mobile in soil, especially in the trivalent oxidation state. These conclusions are further supported by a leachability investigation in which soil chromium mobility was studied for a period of 4 years (Sheppard and Thibault 1991). The vertical migration pattern of chromium in this soil indicated that after an initial period of mobility, chromium forms insoluble complexes and little leaching is observed. Chromium present as insoluble oxide, $Cr_2O_3 \cdot nH_2O$, exhibited limited mobility in soil. Flooding of soils and the subsequent anaerobic decomposition of plant detritus matters may increase the mobilization of chromium (III) in soils due to formation of soluble complexes. This complexation may be facilitated by a lower soil pH. However, given the near-neutral pH of the Vieques soils, the concentration of soluble (i.e., dissolved) chromium (III) is expected to be < 10 µg/L.

A smaller percentage of total chromium in soil may exist as soluble chromium (VI) and chromium (III) complexes, which are more mobile in soil. Organic matter in soil is expected to convert soluble chromate, chromium (VI), to insoluble chromium (III) oxide, Cr_2O_3. On Vieques, the soil total organic carbon (TOC) ranges from 0.04% to 8.68 % and averages 1.26%. While not considered an organic "rich" soil, the organic carbon present may act as a reductant, thereby limiting chromium mobility. Soluble and unadsorbed chromium (VI) and chromium (III) complexes in soil may leach into groundwater. The leachability of chromium (VI) in the soil increases as the pH of the soil increases to more alkaline values. On the other hand, lower, more acidic pH may facilitate leaching of both acid-soluble chromium (III) complexes and chromium (VI) compounds in soil. However, the soil pH measured on Vieques is near neutral to slightly alkaline (pH 5.08 to 9.65; average 7.55) and therefore favors retention of Cr (III) and leaching of Cr (VI). Given the geologic conditions on Vieques, the high annual precipitation, and the near-neutral soil pH, it is anticipated that the majority of the detected soil chromium on Vieques is in the Cr (III) state; this is supported by the soil hexavalent chromium data collected at AOC I.

Conclusions

In conclusion, based on the geochemistry of chromium, the geologic nature of Vieques, and the relatively low concentrations found across the island, the "total" chromium measured in the soils at Vieques is almost certainly predominantly natural and in the trivalent state. The one exception appears to be the chromium concentration in a single soil sample at SWMU 1, which was likely influenced by traces of metal. Most instances of total chromium in the groundwater are due to adsorption to iron or manganese oxyhydroxides, as demonstrated by the removal upon filtration (i.e., chromium concentrations < 10 µg/L in the equivalent dissolved fraction). Due to the low percentage of hexavalent chromium expected to be present (approximately 1 percent of the "total" chromium concentration) at each site, the contribution of hexavalent chromium to the overall risk estimates for each site is insignificant and does not warrant quantification in Step 6 for each site.

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Appendix D
Analytical Laboratory Results

TABLE D-1

Phase I RFI Surface Soil Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID	67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date	03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name																	
Volatile Organic Compounds (µg/kg)																	
1,1,1,2-Tetrachloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,1,1-Trichloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,1,2,2-Tetrachloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,1,2-Trichloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,1-Dichloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,1-Dichloroethene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,2,3-Trichloropropane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,2,4-Trichlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
1,2-Dibromo-3-chloropropane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,2-Dibromoethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,2-Dichlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
1,2-Dichloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
1,2-Dichloropropane	3.8 UJ	4.2 UJ	3.5 UJ	4.4 UJ	5.1 UJ	4.2 UJ	6.4 UJ	5.2 UJ	4.6 UJ	6.6 UJ	6 UJ	7 UJ	6.8 UJ	8.2 UJ	8.3 UJ	5.5 UJ	5.7 UJ
1,3-Dichlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
1,4-Dichlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2-Butanone	19	19 U	12	5.6 J	13 U	11 U	20 J	6.8 J	13	11 J	20	9.4 J	13 J	15 J	15 J	14 U	14 U
2-Chloro-1,3-butadiene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
2-Hexanone	9.5 U	10 U	8.8 U	11 U	13 U	11 U	16 UJ	13 U	12 U	16 U	15 U	17 U	17 UJ	21 U	21 UJ	14 U	14 U
4-Methyl-2-pentanone	9.5 U	10 U	8.8 U	11 U	13 U	11 U	16 UJ	13 U	12 U	16 U	15 U	17 U	17 UJ	21 U	21 UJ	14 U	14 U
Acetone	240	220	140	63	79	110	280 J	110	170	95	170	120 J	200 J	190	210 J	14 R	14 R
Acetonitrile	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Acrolein	38 R	42 R	35 R	44 R	51 R	42 R	64 R	52 R	46 R	66 R	60 R	70 R	68 R	82 R	83 R	55 R	57 R
Acrylonitrile	38 R	42 R	35 R	44 R	51 R	42 R	64 R	52 R	46 R	66 R	60 R	70 R	68 R	82 R	83 R	55 R	57 R
Allyl chloride	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Benzene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	0.59 J	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Bromodichloromethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Bromoform	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Bromomethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Carbon disulfide	3.8 U	4.2 U	3.5 U	0.92 J	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	5.1 J	36 J	0.86 J	2.7 J	15	1.7 J	5.5 U	5.7 U
Carbon tetrachloride	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Chlorobenzene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Chloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Chloroform	3.8 U	4.2 U	0.24 J	0.3 J	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Chloromethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	0.42 J	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	0.76 J	6.8 UJ	8.2 U	0.82 J	5.5 UJ	5.7 UJ
cis-1,3-Dichloropropene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Dibromochloromethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Dibromomethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Dichlorodifluoromethane (Freon-12)	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Ethylbenzene	3.8 U	4.2 UJ	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Ethyl methacrylate	38 U	42 U	35 U	44 U	51 U	42 U	64 UJ	52 U	46 U	66 U	60 U	70 U	68 UJ	82 U	83 UJ	55 U	57 U
Iodomethane	1.9 J	0.7 J	1.1 J	4.4 U	5.1 U	1.6 J	6.4 UJ	1.8 J	2.9 J	1.2 J	0.77 J	2.5 J	2.9 J	2.3 J	2.5 J	5.5 U	5.7 U
Isobutanol	190 R	210 R	180 R	220 R	250 R	210 R	320 R	260 R	230 R	330 R	300 R	350 R	340 R	410 R	410 R	280 R	280 R
Methacrylonitrile	38 U	42 U	35 U	44 U	51 U	42 U	64 UJ	52 U	46 U	66 U	60 U	70 U	68 UJ	82 U	83 UJ	55 U	57 U
m- and p-Xylene	7.6 U	0.12 J	7 U	8.8 U	10 U	8.5 U	13 UJ	10 U	9.2 U	13 U	0.24 J	0.42 J	0.34 J	0.38 J	17 UJ	11 U	11 U
Methyl methacrylate	38 R	42 R	35 R	44 R	51 R	42 R	64 R	52 R	46 R	66 R	60 R	70 R	68 R	82 R	83 R	55 R	57 R
Methylene chloride	3.8 U	4.2 U	0.35 J	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
o-Xylene	3.8 U	4.2 UJ	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Propionitrile	190 R	210 R	180 R	220 R	250 R	210 R	320 R	260 R	230 R	330 R	300 R	350 R	340 R	410 R	410 R	280 R	280 R
Styrene	3.8 U	4.2 UJ	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Tetrachloroethene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Toluene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
trans-1,2-Dichloroethene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
trans-1,3-Dichloropropene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
trans-1,4-Dichloro-2-butene	15 U	17 U	14 U	18 U	20 U	17 U	26 UJ	21 U	18 U	26 U	24 U	28 U	27 UJ	33 U	33 UJ	22 U	23 U
Trichloroethene	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Trichlorofluoromethane (Freon-11)	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Vinyl acetate	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Vinyl chloride	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Xylene, total	3.8 U	0.12 J	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	0.23 J	0.42 J	0.33 J	0.38 J	8.3 UJ	5.5 U	5.7 U

TABLE D-1

Phase I RFI Surface Soil Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID	67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date	03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name																	
Semivolatile Organic Compounds (µg/kg)																	
1,2,4,5-Tetrachlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
1,4-Dioxane	190 R	210 R	180 R	220 R	250 R	210 R	320 R	260 R	230 R	330 R	300 R	350 R	340 R	410 R	410 R	280 R	280 R
1,4-Naphthoquinone	190 UJ	200 UJ	360 UJ	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ	260 UJ	250 U	280 U	270 U	290 U	360 UJ	200 UJ	200 UJ
1-Naphthylamine	190 U	200 UJ	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 R	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
2,2'-Oxybis(1-chloropropane)	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2,3,4,6-Tetrachlorophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4,5-Trichlorophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4,6-Trichlorophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4-Dichlorophenol	380 U	390 UJ	710 U	350 U	380 U	380 UJ	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4-Dimethylphenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4-Dinitrophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2,4-Dinitrotoluene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2,6-Dichlorophenol	380 UJ	390 UJ	710 UJ	350 UJ	380 UJ	380 UJ	400 UJ	430 UJ	420 UJ	500 U	480 U	540 U	520 U	570 U	700 UJ	380 UJ	380 UJ
2,6-Dinitrotoluene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2-Acetylaminofluorene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
2-Chloronaphthalene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2-Chlorophenol	380 U	390 U	710 U	350 U	380 UJ	380 U	400 UJ	430 UJ	420 UJ	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2-Methyl-5-nitroaniline	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
2-Methylaniline	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
2-Methylnaphthalene	9.4 U	0.81 J	8.9 U	8.8 U	9.5 U	9.5 U	10 UJ	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	18 U	9.5 U	9.5 U
2-Methylphenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2-Naphthylamine	190 U	200 UJ	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
2-Nitroaniline	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
2-Nitrophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
2-Picoline	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
3,3'-Dichlorobenzidine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
3-Methylcholanthrene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
3-Methylphenol	280 UJ	290 UJ	540 U	260 U	290 U	290 UJ	300 U	320 U	320 U	380 U	360 U	410 U	400 U	430 U	530 UJ	290 U	290 U
3-Nitroaniline	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	260 U	250 U	280 U	270 U	290 U	360 UJ	380 U	380 U
4,6-Dinitro-2-methylphenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
4-Aminobiphenyl	190 U	200 UJ	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
4-Bromophenyl-phenylether	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
4-Chloro-3-methylphenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
4-Chloroaniline	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	260 U	250 U	280 U	270 U	290 U	360 UJ	380 U	380 U
4-Chlorophenyl-phenylether	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
4-Methylphenol	280 U	290 U	540 U	260 U	290 U	290 U	300 U	320 U	320 U	380 U	360 U	410 U	400 U	430 U	530 UJ	290 U	290 U
4-Nitroaniline	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	260 U	250 U	280 U	270 U	290 U	360 UJ	380 U	380 U
4-Nitrophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 UJ	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
4-Nitroquinoline-1-oxide	190 UJ	200 UJ	360 UJ	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 UJ	200 UJ
7,12-Dimethylbenz(a)anthracene	190 UJ	200 UJ	360 UJ	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ	260 U	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 UJ	200 UJ
Acenaphthene	9.4 U	9.8 U	8.9 U	8.8 U	9.5 U	9.5 U	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	1.1 J	0.75 J
Acenaphthylene	9.4 U	1.2 J	8.9 U	1.4 J	9.5 U	9.5 U	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	3.6 J	1.9 J
Acetophenone	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Aniline	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Anthracene	0.5 J	0.69 J	0.72 J	1.4 J	9.5 U	9.5 U	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	2.5 J	1.5 J
Aramite	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Benzo(a)anthracene	1.2 J	2.7 J	3.8 J	4.7 J	9.5 U	1 J	10 U	11 U	11 U	13 UJ	28 J	14 U	13 U	14 U	52	11	8.6 J
Benzo(a)pyrene	1.6 J	9.8 U	4.8 J	6.9 J	0.6 J	1.6 J	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	70	11	10
Benzo(b)fluoranthene	1.4 J	4.1 J	5.1 J	5.2 J	9.5 UJ	2.5 J	10 UJ	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	110	6.7 J	6.5 J
Benzo(g,h,i)perylene	1.7 J	3.4 J	3.7 J	4.9 J	0.47 J	1.6 J	10 U	11 U	11 U	13 U	12 U	14 U	23	14 U	73	9.2 J	8.8 J
Benzo(k)fluoranthene	1.9 J	3.1 J	8.9 U	8.8 U	0.55 J	1.6 J	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	74	8 J	6.6 J
Benzyl alcohol	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 UJ	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
bis(2-Chloroethoxy)methane	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
bis(2-Chloroethyl)ether	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
bis(2-Ethylhexyl)phthalate	190 U	200 U	360 U	39 J	200 U	200 U	210 U	220 U	220 U	350 U	440 U	280 U	270 U	290 U	360 UJ	100 J	64 J
Butylbenzylphthalate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Chrysene	1.5 J	3.5 J	3.1 J	6.8 J	9.5 U	0.96 J	10 U	11 U	11 U	13 UJ	24 J	14 U	13 U	14 U	77	10	7.4 J
Dibenz(a,h)anthracene	0.5 J	9.8 UJ	0.81 J	1.2 J	9.5 U	9.5 UJ	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	28	2 J	1.6 J
Dibenzofuran	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Diethylphthalate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Dimethyl phthalate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Di-n-butylphthalate	190 U	200 U	360 U	180 U	200 U	200 U	23 J	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Di-n-octylphthalate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Ethyl methanesulfonate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Fluoranthene	9.4 U	5.9 J	5.9 J	17	9.5 U	9.5 U	10 U	11 U	11 U	13 UJ	43 J	14 U	13 U	14 U	95	17	15
Fluorene	9.4 UJ	9.8 U	8.9 U	8.8 U	9.5 UJ	9.5 U	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	9.5 U	9.5 U
Hexachlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Hexachlorobutadiene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U

TABLE D-1

Phase I RFI Surface Soil Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID	67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date	03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name																	
Hexachlorocyclopentadiene	190 U	200 UJ	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Hexachloroethane	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Hexachloropropene	190 UJ	200 UJ	360 UJ	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 UJ	200 UJ
Indeno(1,2,3-cd)pyrene	2 J	4.5 J	3.6 J	6.9 J	0.62 J	1.9 J	10 UJ	11 UJ	11 UJ	13 U	12 U	14 U	13 U	14 U	100	8.8 J	9.6
Isophorone	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Isosafrole	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Methapyrilene	190 UJ	200 R	360 U	180 U	200 UJ	200 R	210 UJ	220 UJ	220 UJ	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
Methyl methanesulfonate	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Naphthalene	9.4 U	9.8 U	8.9 U	8.8 U	9.5 U	9.5 U	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	9.5 U	9.5 U
n-Nitrosodiethylamine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
n-Nitrosodimethylamine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
n-Nitroso-di-n-butylamine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
n-Nitroso-di-n-propylamine	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
n-Nitrosodiphenylamine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
N-Nitrosomorpholine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
n-Nitroso-n-methylethylamine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
N-Nitrosopiperidine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
n-Nitrosopyrrolidine	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
Nitrobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
p-Dimethylaminoazobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
Pentachlorobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Pentachloroethane	3.8 U	4.2 U	3.5 U	4.4 U	5.1 U	4.2 U	6.4 UJ	5.2 U	4.6 U	6.6 U	6 U	7 U	6.8 UJ	8.2 U	8.3 UJ	5.5 U	5.7 U
Pentachloronitrobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Pentachlorophenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
Phenacetin	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Phenanthrene	9.4 U	2.8 J	2.7 J	6.1 J	9.5 U	1.6 J	10 U	11 U	11 U	13 U	12 U	14 U	13 U	14 U	18 U	8.2 J	6 J
Phenol	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
p-Phenylenediamine	1,900 R	2,000 R	3,600 R	1,800 R	2,000 R	2,000 R	2,100 R	2,200 R	2,200 R	2,600 R	2,500 R	2,800 R	2,700 R	2,900 R	3,600 R	2,000 R	2,000 R
Pronamide	380 U	390 U	710 U	350 U	380 U	380 U	400 U	430 U	420 U	500 U	480 U	540 U	520 U	570 U	700 UJ	380 U	380 U
Pyrene	1 J	4.7 J	6 J	13	9.5 U	1.2 J	10 U	11 U	11 U	13 UJ	51 J	14 U	13 U	14 U	90	16	16
Pyridine	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Safrole	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Herbicides (µg/kg)																	
cis-Diallate	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
trans-Diallate	190 UJ	200 UJ	360 UJ	180 UJ	200 UJ	200 UJ	210 UJ	220 UJ	220 UJ	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 UJ	200 UJ
Diallate	190 U	200 U	360 U	180 U	200 UJ	200 U	210 UJ	220 UJ	220 UJ	260 UJ	250 UJ	280 UJ	270 UJ	290 UJ	360 UJ	200 U	200 U
Dinoseb	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 UJ	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Explosives (µg/kg)																	
1,3,5-Trinitrobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
1,3-Dinitrobenzene	190 U	200 U	360 U	180 U	200 U	200 U	210 U	220 U	220 U	260 U	250 U	280 U	270 U	290 U	360 UJ	200 U	200 U
Total Metals (mg/kg)																	
Antimony	1.1 UJ	0.52 J	0.14 J	0.26 J	1.1 UJ	1.2 UJ	1.2 UJ	1.2 UJ	1.3 UJ	1.2 J	1.4 UJ	1.5 UJ	1.5 UJ	1.7 UJ	2 UJ	0.21 J	0.17 J
Arsenic	0.23 J	1	0.52 U	0.99	0.49 J	0.57 U	0.73	1.4	1.4	1.2	0.99	0.93	0.89	1.6	1.3	2.9	5
Barium	127	130	203	94.7	56.2	31.8	59.1	48.1 J	23.9 J	62	53.3	44.8	68.3	61.8	113	116	108
Beryllium	0.29 J	0.35 J	0.4 J	0.25 J	0.19 J	0.14 J	0.19 J	0.38 J	0.2 J	0.27 J	0.24 J	0.28 J	0.25 J	0.31 J	0.31 J	0.34 J	0.3 J
Cadmium	0.26 J	0.36 J	0.17 J	0.24 J	0.18 J	0.13 J	0.18 J	0.14 J	0.16 J	0.79	0.7	0.51 J	0.32 J	0.35 J	0.79 J	0.35 J	0.35 J
Chromium	41.8	41.3 J	47.4 J	33.6 J	13	16.4 J	24.1	25.2	32.8	28.2	21	27.5	23.8	36	37.2	28 J	47.9 J
Cobalt	23.2 J	38.1 J	24.7	26.5	21 J	15.6 J	24.4 J	10.6 J	10 J	44.5 J	35.9 J	45.6 J	32.8 J	41.8 J	25.7 J	28.9	25.7
Copper	115 J	277 J	50.7	99.2	80.1 J	55.7 J	78.4 J	44.4 J	37.6 J	77.1 J	58.3 J	63.4 J	64 J	65.4 J	133 J	102	150
Lead	13.4 J	62.4	4.3	9.3	2.2 J	2.1	3.7 J	4.2 J	8.7 J	134 J	119 J	35.6 J	11 J	21.2 J	31.3 J	23.8	31.5
Mercury	0.041	0.066	0.037	0.037	0.011	0.038 U	0.011	0.015	0.17	0.028 J	0.04	0.033	0.023	0.041	0.084	0.081	0.054
Nickel	13.6	16.3 J	11.5	15.2	6.7	12 J	9.8	7.4 J	4.1 J	12.8	10.1	11.7	9.8	12.3	12.3	11.2	16.6
Selenium	1.2 J	1.5 J	0.58 J	0.42 J	0.43 J	0.34 J	0.49 J	1.6 J	2.2 J	1.4 J	1.2 J	1.4 J	1.5 J	1.5 J	1.6 J	1.3 J	1 J
Silver	0.57 U	0.082 J	0.52 U	0.057 J	0.56 U	0.57 U	0.59 U	0.61 U	0.63 U	0.15 J	0.69 U	0.77 U	0.76 U	0.85 U	0.99 U	0.077 J	0.049 J
Thallium	0.085 J	0.3 J	0.037 J	0.047 J	0.022 J	0.57 U	0.04 J	0.61 U	0.024 J	0.069 J	0.048 J	0.048 J	0.047 J	0.051 J	0.18 J	0.075 J	0.051 J
Tin	5.7 U	5.9 U	5.2 UJ	5.3 UJ	5.6 U	5.6 U	5.9 U	6.1 U	6.3 U	7.6 U	6.9 U	8 U	7.6 U	8.5 U	9.9 U	5.7 UJ	5.6 UJ
Vanadium	147 J	213 J	150	170	177 J	88.5 J	151 J	320 J	272 J	232 J	190 J	371 J	170 J	282 J	214 J	227	149
Zinc	46.3	85.7 J	32.8 J	67.1 J	61.2	36.8 J	61.3	25.5	33.3	86.8	75	68.7	81.4	65.1	98.1	71.5 J	63.8 J

TABLE D-1

Phase I RFI Surface Soil Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08		67SD01		67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample ID	67SB01-00	67SB02-00	67SB03-00	67SB04-00	67SB05-00	67SB06-00	67SB07-00	67SB08-00	67SB08-00D	67SD01	67SD01D	67SD02	67SD03	67SD04	67SD05	67SS01	67SS02
Sample Date	03/24/10	03/25/10	03/26/10	03/25/10	03/24/10	03/23/10	03/23/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/22/10	03/30/10	03/30/10
Chemical Name																	
Wet Chemistry																	
Total organic carbon (TOC) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	25,440	14,030	25,600	47,770	NA	NA
Total Petroleum Hydrocarbons ()																	
TPH-diesel range (UG/KG)	11,000 U	12,000	11,000 U	11,000 U	110,000	11,000 U	12,000 U	23,000	17,000	31,000 J	20,000 J	27,000 J	28,000 J	34,000 J	41,000 J	11,000 U	11,000 U
TPH-gas range (UG/KG)	570 U	590 UJ	540 U	530 U	570 U	570 U	610 U	650 U	630 U	760 U	720 U	820 U	790 U	860 U	1,100 UJ	570 U	570 U

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Notes:

Shading indicates detections

NA - Not analyzed

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03		67GW04		67GW05	
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01	67SB05-05
Sample Date	05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name														
Volatile Organic Compounds (µg/kg)														
1,1,1,2-Tetrachloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,1,1-Trichloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,1,2,2-Tetrachloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,1,2-Trichloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,1-Dichloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,1-Dichloroethene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,2,3-Trichloropropane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,2,4-Trichlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
1,2-Dibromo-3-chloropropane	12 U	12 U	13 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,2-Dibromoethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,2-Dichlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
1,2-Dichloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
1,2-Dichloropropane	6.2 U	5.9 U	6.5 U	4.5 UJ	3.8 UJ	5.3 UJ	4.3 UJ	4.2 UJ	4.4 UJ	4.5 UJ	3.7 UJ	4.6 UJ	4.7 UJ	4.7 UJ
1,3-Dichlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
1,4-Dichlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Butanone	31 U	6.8 J	11 J	11 U	9.6 U	13 U	11 U	17 U	11 U	8 J	9.3 U	7.2 J	12 U	12 U
2-Chloro-1,3-butadiene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
2-Hexanone	31 U	30 U	32 U	11 U	9.6 U	13 U	11 U	1.5 J	11 U	11 U	9.3 U	11 U	12 U	12 U
4-Methyl-2-pentanone	31 U	30 U	32 U	11 U	9.6 U	13 U	11 U	11 U	11 U	11 U	9.3 U	11 U	12 U	12 U
Acetone	62 U	44 J	43 J	130	120	61	54	150	23 J	120 J	19 U	61	47	12 U
Acetonitrile	250 U	240 U	260 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Acrolein	120 U	120 U	130 U	45 R	38 R	53 R	43 R	42 R	44 R	45 R	37 R	46 R	47 R	47 R
Acrylonitrile	120 U	120 U	130 U	45 R	38 R	53 R	43 R	42 R	44 R	45 R	37 R	46 R	47 R	47 R
Allyl chloride	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Benzene	6.2 U	5.9 U	6.5 U	4.5 U	0.3 J	5.3 U	4.3 U	0.44 J	0.4 J	4.5 U	0.45 J	4.6 U	4.7 U	4.7 U
Bromodichloromethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Bromoform	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Bromomethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Carbon disulfide	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	4.9 J	4.3 U	0.72 J	4.4 U	0.95 J	3.7 U	5	4.7 U	4.7 U
Carbon tetrachloride	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Chlorobenzene	6.2 U	5.9 U	2.9 J	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Chloroethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Chloroform	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Chloromethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	0.92 J	0.3 J	4.2 U	4.4 UJ	0.44 J	3.7 U	4.6 U	4.7 U	4.7 U
cis-1,3-Dichloropropene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Dibromochloromethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Dibromomethane	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Dichlorodifluoromethane (Freon-12)	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Ethylbenzene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Ethyl methacrylate	6.2 U	5.9 U	6.5 U	45 U	38 U	53 U	43 U	42 U	44 U	45 U	37 U	46 U	47 U	47 U
Iodomethane	6.2 U	5.9 U	6.5 U	1.9 J	1 J	5.3 U	0.78 J	4.1 J	4.4 U	1.6 J	3.7 U	1.5 J	4.7 U	4.7 U
Isobutanol	250 U	240 U	260 U	220 R	190 R	260 R	210 R	210 R	220 R	230 R	190 R	230 R	230 R	230 R
Methacrylonitrile	120 U	120 U	130 U	45 U	38 U	53 U	43 U	42 U	44 U	45 U	37 U	46 U	47 U	47 U
m- and p-Xylene	NA	NA	NA	9 U	7.6 U	11 U	8.5 U	8.5 U	8.8 U	9.1 U	7.5 U	9.1 U	9.3 U	9.3 U
Methyl methacrylate	6.2 U	5.9 U	6.5 U	45 R	38 R	53 R	43 R	42 R	44 R	45 R	37 R	46 R	47 R	47 R
Methylene chloride	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
o-Xylene	NA	NA	NA	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Propionitrile	120 U	120 U	130 U	220 R	190 R	260 R	210 R	210 R	220 R	230 R	190 R	230 R	230 R	230 R
Styrene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Tetrachloroethene	6.2 U	5.9 U	2.4 J	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Toluene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
trans-1,2-Dichloroethene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
trans-1,3-Dichloropropene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
trans-1,4-Dichloro-2-butene	12 U	12 U	13 U	18 U	15 U	21 U	17 U	17 U	18 U	18 U	15 U	18 U	19 U	19 U
Trichloroethene	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Trichlorofluoromethane (Freon-11)	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Vinyl acetate	12 U	12 U	13 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Vinyl chloride	6.2 U	5.9 U	6.5 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Xylene, total	12 U	12 U	13 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Semivolatile Organic Compounds (µg/kg)														
1,2,4,5-Tetrachlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
1,4-Dioxane	420 U	410 U	480 U	220 R	190 R	260 R	210 R	210 R	220 R	230 R	190 R	230 R	230 R	230 R
1,4-Naphthoquinone	420 U	410 U	480 U	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ	220 UJ
1-Naphthylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 R	210 U	210 U	220 U
2,2'-Oxybis(1-chloropropane)	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2,3,4,6-Tetrachlorophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03		67GW04		67GW05	
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01	67SB05-05
Sample Date	05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name														
2,4,5-Trichlorophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2,4,6-Trichlorophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2,4-Dichlorophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 UJ	370 UJ	350 U	410 U	350 U	400 U	410 U	430 U
2,4-Dimethylphenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2,4-Dinitrophenol	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2,4-Dinitrotoluene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2,6-Dichlorophenol	420 U	410 U	480 U	360 UJ	350 UJ	410 UJ	400 UJ	370 UJ	350 UJ	410 UJ	350 UJ	400 UJ	410 UJ	430 UJ
2,6-Dinitrotoluene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Acetylaminofluorene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Chloronaphthalene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Chlorophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 UJ	430 U
2-Methyl-5-nitroaniline	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Methylaniline	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Methylnaphthalene	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	10 U	8.9 U	10 U	10 U	11 U
2-Methylphenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2-Naphthylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Nitroaniline	2,200 U	2,100 U	2,500 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
2-Nitrophenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
2-Picoline	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
3,3'-Dichlorobenzidine	850 U	810 U	960 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
3,3'-Dimethylbenzidine	2,200 U	2,100 U	2,500 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 R	210 U	210 U	220 U
3-Methylcholanthrene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
3-Methylphenol	NA	NA	NA	270 UJ	260 UJ	310 UJ	300 UJ	280 UJ	270 U	310 U	270 U	300 U	310 U	320 UJ
3-Nitroaniline	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4,6-Dinitro-2-methylphenol	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4-Aminobiphenyl	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
4-Bromophenyl-phenylether	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
4-Chloro-3-methylphenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4-Chloroaniline	850 U	810 U	960 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4-Chlorophenyl-phenylether	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
4-Methylphenol	420 U	410 U	480 U	270 U	260 U	310 U	300 U	280 U	270 U	310 U	270 U	300 U	310 U	320 U
4-Nitroaniline	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4-Nitrophenol	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
4-Nitroquinoline-1-oxide	4,200 U	4,100 U	4,800 U	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ	220 UJ
7,12-Dimethylbenz(a)anthracene	420 U	410 U	480 U	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ	220 UJ
a,a-Dimethylphenethylamine	86,000 U	83,000 U	97,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	10 U	8.9 U	10 U	10 U	11 U
Acenaphthylene	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	0.67 J	8.9 U	10 U	1.2 J	10 U	10 U	11 U
Acetophenone	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Aniline	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
Anthracene	420 U	410 U	480 U	9 U	0.63 J	10 U	10 U	9.3 U	8.9 U	10 U	1.5 J	10 U	10 U	11 U
Aramite	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Benzo(a)anthracene	420 U	410 U	480 U	9 U	1.5 J	10 U	10 UJ	9.3 UJ	0.9 J	0.78 J	4.8 J	10 U	10 U	11 U
Benzo(a)pyrene	420 U	410 U	480 U	0.45 J	1.6 J	10 U	10 U	9.3 U	0.66 J	10 U	5.6 J	10 U	10 U	11 U
Benzo(b)fluoranthene	420 U	410 U	480 U	9 UJ	1.1 J	10 UJ	10 UJ	9.3 UJ	1 NJ	0.84 NJ	4.6 J	10 U	10 UJ	11 UJ
Benzo(g,h,i)perylene	120 J	75 J	480 U	9 U	1.5 J	0.56 J	10 UJ	9.3 UJ	8.9 U	10 U	3.6 J	0.79 J	10 U	11 U
Benzo(k)fluoranthene	420 U	410 U	480 U	0.48 J	1.5 J	10 U	10 UJ	9.3 UJ	0.95 NJ	0.79 NJ	8.9 U	10 U	10 U	11 U
Benzyl alcohol	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
bis(2-Chloroethoxy)methane	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
bis(2-Chloroethyl)ether	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
bis(2-Ethylhexyl)phthalate	420 U	410 U	480 U	180 U	61 J	210 U	200 U	190 U	46 J	210 U	49 J	61 J	210 U	220 U
Butylbenzylphthalate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Chrysene	420 U	410 U	480 U	9 U	1.3 J	10 U	10 U	9.3 U	0.8 J	10 U	6.4 J	10 U	10 U	11 U
Dibenz(a,h)anthracene	110 J	63 J	480 U	9 U	8.8 UJ	10 U	10 UJ	9.3 UJ	8.9 U	10 U	8.9 U	10 U	10 U	11 U
Dibenzofuran	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Diethylphthalate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Dimethyl phthalate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Di-n-butylphthalate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Di-n-octylphthalate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Ethyl methanesulfonate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Fluoranthene	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	10 U	16	10 U	10 U	11 U
Fluorene	420 U	410 U	480 U	9 UJ	8.8 UJ	10 UJ	10 U	9.3 U	8.9 U	10 U	8.9 U	10 U	10 UJ	11 UJ
Hexachlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Hexachlorobutadiene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Hexachlorocyclopentadiene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Hexachloroethane	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Hexachlorophene	220,000 U	210,000 U	250,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloropropene	420 U	410 U	480 U	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ	220 UJ
Indeno(1,2,3-cd)pyrene	110 J	60 J	480 U	0.49 J	1.8 J	0.67 J	10 UJ	9.3 UJ	8.9 U	0.55 J	5.4 J	10 U	10 U	11 U

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03		67GW04		67GW05	
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01	67SB05-05
Sample Date	05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name														
Isophorone	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Isosafrole	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Methapyrilene	86,000 U	83,000 U	97,000 U	180 UJ	180 UJ	210 UJ	200 R	190 R	180 U	210 U	180 R	210 U	210 UJ	220 UJ
Methyl methanesulfonate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
Naphthalene	420 U	410 U	480 U	9 U	8.8 U	1.4 J	10 U	9.3 U	8.9 U	10 U	8.9 U	10 U	10 U	11 U
n-Nitrosodiethylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
n-Nitrosodimethylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
n-Nitroso-di-n-butylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
n-Nitroso-di-n-propylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
n-Nitrosodiphenylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
N-Nitrosomorpholine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
n-Nitroso-n-methylethylamine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
N-Nitrosopiperidine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
n-Nitrosopyrrolidine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Nitrobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
O,O,O-Triethyl phosphorothioate	420 U	410 U	480 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Pentachlorobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Pentachloroethane	31 U	30 U	32 U	4.5 U	3.8 U	5.3 U	4.3 U	4.2 U	4.4 U	4.5 U	3.7 U	4.6 U	4.7 U	4.7 U
Pentachloronitrobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Pentachlorophenol	2,200 U	2,100 U	2,500 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
Phenacetin	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Phenanthrene	420 U	410 U	480 U	9 U	8.8 U	10 U	10 U	9.3 U	8.9 U	2.2 J	6.3 J	10 U	10 U	11 U
Phenol	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
p-Phenylenediamine	2,200 U	2,100 U	2,500 U	1,800 R	1,800 R	2,100 R	2,000 R	1,900 R	1,800 R	2,100 R	1,800 R	2,100 R	2,100 R	2,200 R
Pronamide	420 U	410 U	480 U	360 U	350 U	410 U	400 U	370 U	350 U	410 U	350 U	400 U	410 U	430 U
Pyrene	420 U	410 U	480 U	9 U	1.1 J	0.74 J	0.68 J	9.3 U	0.99 J	1.5 J	13	0.73 J	10 U	11 U
Pyridine	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
Safrole	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Herbicides (µg/kg)														
cis-Diallate	NA	NA	NA	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
trans-Diallate	NA	NA	NA	180 UJ	180 UJ	210 UJ	200 UJ	190 UJ	180 UJ	210 UJ	180 UJ	210 UJ	210 UJ	220 UJ
Diallate	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 UJ	220 U
Dinoseb	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Explosives (µg/kg)														
1,3,5-Trinitrobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
1,3-Dinitrobenzene	420 U	410 U	480 U	180 U	180 U	210 U	200 U	190 U	180 U	210 U	180 U	210 U	210 U	220 U
Total Metals (mg/kg)														
Antimony	2.4 U	2.2 U	2.7 U	1.1 UJ	1.1 UJ	6.2 UJ	1.2 UJ	1.1 UJ	0.14 J	6.1 UJ	1.1 UJ	0.2 J	1.2 UJ	1.2 UJ
Arsenic	1.2 U	0.85 B	1.3 U	0.66	0.63	3.1 U	0.6 U	1.2	0.37 J	3.1 U	0.85	0.95	1.4	0.97
Barium	250	190	140	114	153	652	251	282	58.8	18.3 J	66.9	139	22.6	55.4
Beryllium	0.21 B	0.32 B	0.33 B	0.32 J	0.35 J	4.9	0.78	0.55 J	0.19 J	0.32 J	0.18 J	0.57	0.21 J	0.097 J
Cadmium	3 U	0.56 U	0.67 U	0.22 J	0.2 J	0.85 J	0.2 J	0.45 J	0.21 J	3.1 U	0.27 J	0.4 J	0.13 J	0.59 U
Chromium	10	9	40	34.7	37.6	233	57.6 J	48.8 J	6.7 J	11.5 J	41.7 J	22.4 J	20.4	9.6
Cobalt	10	23	36	27.4 J	30.7 J	472 J	28.8 J	99.2 J	27.1	15	22.7	39.5	11.6 J	1.9 J
Copper	36	18	120	91.4 J	98.2 J	681 J	138 J	56.2 J	78.4	28.7	92.3	42.1	34.5 J	29.3 J
Lead	1.9	0.83	1.9	142 R	7.5 R	12.3 J	4.5	8.5	1.1	1.7 J	8.3	4.4	4.7 J	2.1 J
Mercury	0.019 B	0.023 U	0.019 B	0.024	0.027	0.041 U	0.02 J	0.098	0.035 U	0.082	0.035 U	0.12	0.22	0.043 U
Nickel	4.9	5.4	18	12.5	14.3 J	310	26.6 J	15.4 J	5.3	4.7	15.8	6.6	3.4	1.3
Selenium	1.2 U	1.1 U	1.3 U	0.95 J	0.96 J	5.9 J	1 J	1.7 J	0.22 J	1.4 J	0.37 J	2.2 J	2.4 J	1.3 J
Silver	1.2 U	1.1 U	1.3 U	0.69	0.53 U	3.1 U	0.6 U	0.56 U	0.05 J	3.1 U	0.54 U	0.099 J	0.62 U	0.59 U
Thallium	1.2 U	1.1 U	1.3 U	0.26 J	0.31 J	4.2	0.58 J	0.21 J	0.055 J	3.1 U	0.039 J	0.059 J	0.061 J	0.035 J
Tin	2 B	1.6 B	2.1 B	5.3 U	5.3 U	6.2 U	5.6 U	5.6 U	5.2 UJ	6.1 UJ	5.3 UJ	5.9 UJ	6.2 U	5.9 U
Vanadium	240	210	200	196 J	200 J	1,480 J	228 J	306 J	160	176	143	233	267 J	155 J
Zinc	52	210	67	62.8	72	541	97 J	67.4 J	64.5 J	48.1 J	55.5 J	63.4 J	19.6	15.6
Wet Chemistry														
% Solids (pct)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons ()														
Diesel fuel (UG/KG)	2,700 J	2,600 J	3,200 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Identification of Gasoline (UG/KG)	300 U	270 U	270 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	NA	NA	NA	11,000 U	11,000 U	12,000 U	12,000 U	13,000	11,000 U	13,000 U	11,000 U	12,000 U	18,000	13,000 U
TPH-gas range (UG/KG)	NA	NA	NA	540 U	530 U	620 U	600 U	560 U	540 U	620 U	530 U	610 U	620 U	650 U

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TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB01	13E-SB02	13E-SB03	67GW01			67GW02		67GW03		67GW04		67GW05	
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05	67SB01-01	67SB01-01D	67SB01-03	67SB02-01	67SB02-02	67SB03-01	67SB03-04	67SB04-01	67SB04-03	67SB05-01	67SB05-05
Sample Date	05/08/04	05/08/04	05/08/04	03/24/10	03/24/10	03/24/10	03/25/10	03/25/10	03/26/10	03/26/10	03/25/10	03/25/10	03/24/10	03/24/10
Chemical Name														

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

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

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct - Percent

µg/kg - Micrograms per kilogram

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW06			67GW07		67GW08		67SB09		67SB09R		67SB10
Sample ID	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05	NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507
Sample Date	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	01/24/14	01/24/14	07/03/14	07/03/14	07/03/14
Chemical Name												
Volatile Organic Compounds (µg/kg)												
1,1,1,2-Tetrachloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,1-Dichloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,1-Dichloroethene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,2-Dibromoethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
1,2-Dichloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
1,2-Dichloropropane	4.2 UJ	4 UJ	4.7 UJ	4.3 UJ	5.5 UJ	3.8 UJ	4.4 UJ	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Butanone	11 U	9.9 U	12 U	2.2 J	14 U	9.6 UJ	11 U	NA	NA	NA	NA	NA
2-Chloro-1,3-butadiene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
2-Hexanone	11 U	9.9 U	12 U	11 U	14 U	9.6 UJ	11 U	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	11 U	9.9 U	12 U	11 U	14 U	9.6 UJ	11 U	NA	NA	NA	NA	NA
Acetone	88	52	21 U	29	17 U	61 J	11 U	NA	NA	NA	NA	NA
Acetonitrile	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Acrolein	42 R	40 R	47 R	43 R	55 R	38 R	44 R	NA	NA	NA	NA	NA
Acrylonitrile	42 R	40 R	47 R	43 R	55 R	38 R	44 R	NA	NA	NA	NA	NA
Allyl chloride	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Benzene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Bromodichloromethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Bromoform	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Bromomethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Carbon disulfide	4.2 UJ	4.7 J	4.7 U	0.65 J	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Carbon tetrachloride	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Chlorobenzene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Chloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Chloroform	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Chloromethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Dibromochloromethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Dibromomethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Ethylbenzene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Ethyl methacrylate	42 U	40 U	47 U	43 U	55 U	38 UJ	44 U	NA	NA	NA	NA	NA
Iodomethane	1.3 J	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Isobutanol	210 R	200 R	240 R	210 R	280 R	190 R	220 R	NA	NA	NA	NA	NA
Methacrylonitrile	42 U	40 U	47 U	43 U	55 U	38 UJ	44 U	NA	NA	NA	NA	NA
m- and p-Xylene	8.5 U	7.9 U	9.4 U	8.5 U	0.32 J	7.7 UJ	8.8 U	NA	NA	NA	NA	NA
Methyl methacrylate	42 R	40 R	47 R	43 R	55 R	38 R	44 R	NA	NA	NA	NA	NA
Methylene chloride	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
o-Xylene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Propionitrile	210 R	200 R	240 R	210 R	280 R	190 R	220 R	NA	NA	NA	NA	NA
Styrene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Tetrachloroethene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Toluene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	17 U	16 U	19 U	17 U	22 U	15 UJ	18 U	NA	NA	NA	NA	NA
Trichloroethene	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Trichlorofluoromethane (Freon-11)	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Vinyl acetate	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Vinyl chloride	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Xylene, total	4.2 U	4 U	4.7 U	4.3 U	0.31 J	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/kg)												
1,2,4,5-Tetrachlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
1,4-Dioxane	210 R	200 R	240 R	210 R	280 R	190 R	220 R	NA	NA	NA	NA	NA
1,4-Naphthoquinone	200 UJ	190 UJ	200 UJ	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
1-Naphthylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW06			67GW07		67GW08		67SB09		67SB09R		67SB10
Sample ID	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05	NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507
Sample Date	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	01/24/14	01/24/14	07/03/14	07/03/14	07/03/14
Chemical Name												
2,4,5-Trichlorophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2,4-Dichlorophenol	380 UJ	370 UJ	400 UJ	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2,4-Dimethylphenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2,4-Dinitrophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2,6-Dichlorophenol	380 UJ	370 UJ	400 UJ	380 UJ	430 UJ	380 UJ	420 UJ	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Acetylaminofluorene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Chloronaphthalene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Chlorophenol	380 U	370 U	400 U	380 UJ	430 UJ	380 UJ	420 UJ	NA	NA	NA	NA	NA
2-Methyl-5-nitroaniline	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Methylaniline	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Methylnaphthalene	9.7 U	9.3 U	0.93 J	9.5 UJ	11 UJ	9.7 UJ	11 UJ	NA	NA	NA	NA	NA
2-Methylphenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2-Naphthylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Nitroaniline	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
2-Nitrophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
2-Picoline	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
3,3'-Dimethylbenzidine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
3-Methylcholanthrene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
3-Methylphenol	290 UJ	280 U	300 U	290 U	320 U	290 U	320 U	NA	NA	NA	NA	NA
3-Nitroaniline	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4-Aminobiphenyl	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4-Chloroaniline	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
4-Methylphenol	290 U	280 U	300 U	290 U	320 U	290 U	320 U	NA	NA	NA	NA	NA
4-Nitroaniline	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4-Nitrophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
4-Nitroquinoline-1-oxide	200 UJ	190 UJ	200 UJ	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
7,12-Dimethylbenz(a)anthracene	200 UJ	190 UJ	200 UJ	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
a,a-Dimethylphenethylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	9.7 U	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Acenaphthylene	9.7 U	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Acetophenone	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Aniline	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Anthracene	0.52 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Aramite	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.83 J	9.3 U	10 UJ	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.47 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.79 J	9.3 UJ	10 UJ	9.5 UJ	11 UJ	9.7 UJ	11 UJ	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.51 J	9.3 UJ	10 UJ	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Benzyl alcohol	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Butylbenzylphthalate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Chrysene	0.74 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	9.7 UJ	9.3 U	10 UJ	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Dibenzofuran	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Diethylphthalate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Dimethyl phthalate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Di-n-butylphthalate	200 U	190 U	200 U	24 J	29 J	21 J	220 U	NA	NA	NA	NA	NA
Di-n-octylphthalate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Ethyl methanesulfonate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Fluoranthene	1.6 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Fluorene	9.7 U	9.3 UJ	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Hexachlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Hexachlorobutadiene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Hexachloroethane	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Hexachlorophene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloropropene	200 UJ	190 UJ	200 UJ	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.5 J	9.3 U	10 UJ	9.5 UJ	11 UJ	9.7 UJ	11 UJ	NA	NA	NA	NA	NA

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW06			67GW07		67GW08		67SB09		67SB09R		67SB10
Sample ID	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05	NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507
Sample Date	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	01/24/14	01/24/14	07/03/14	07/03/14	07/03/14
Chemical Name												
Isophorone	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Isosafrole	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Methapyrilene	200 R	190 R	200 R	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Methyl methanesulfonate	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Naphthalene	9.7 U	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
n-Nitrosodiethylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
n-Nitroso-di-n-butylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
N-Nitrosomorpholine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
n-Nitroso-n-methylethylamine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
N-Nitrosopiperidine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
n-Nitrosopyrrolidine	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Nitrobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
O,O,O-Triethyl phosphorothioate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Pentachlorobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Pentachloroethane	4.2 U	4 U	4.7 U	4.3 U	5.5 U	3.8 UJ	4.4 U	NA	NA	NA	NA	NA
Pentachloronitrobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Pentachlorophenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
Phenacetin	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Phenanthrene	2.2 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Phenol	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
p-Phenylenediamine	2,000 R	1,900 R	2,000 R	2,000 R	2,200 R	2,000 R	2,200 R	NA	NA	NA	NA	NA
Pronamide	380 U	370 U	400 U	380 U	430 U	380 U	420 U	NA	NA	NA	NA	NA
Pyrene	1.4 J	9.3 U	10 U	9.5 U	11 U	9.7 U	11 U	NA	NA	NA	NA	NA
Pyridine	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Safrole	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Herbicides (µg/kg)												
cis-Diallate	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
trans-Diallate	200 UJ	190 UJ	200 UJ	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Diallate	200 U	190 U	200 U	200 UJ	220 UJ	200 UJ	220 UJ	NA	NA	NA	NA	NA
Dinoseb	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Explosives (µg/kg)												
1,3,5-Trinitrobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	200 U	190 U	200 U	200 U	220 U	200 U	220 U	NA	NA	NA	NA	NA
Total Metals (mg/kg)												
Antimony	1.2 UJ	1.1 UJ	1.2 UJ	1.1 UJ	5.9 UJ	1.1 UJ	1.2 UJ	NA	NA	NA	NA	NA
Arsenic	1.8	0.6	0.28 J	0.71	3 U	0.95	0.62 U	NA	NA	NA	NA	NA
Barium	122 J	174 J	4.5 J	99	87.4	112	58.6	NA	NA	NA	NA	NA
Beryllium	0.63	0.31 J	0.23 J	0.15 J	1.4 J	0.42 J	0.071 J	NA	NA	NA	NA	NA
Cadmium	0.38 J	0.21 J	0.068 J	0.16 J	0.31 J	0.33 J	0.15 J	NA	NA	NA	NA	NA
Chromium	36.6 J	14.6 J	2.5 J	7.5	76.9	10.8	7.1	NA	NA	NA	NA	NA
Cobalt	105 J	44 J	5.2 J	29.6 J	75.2 J	58.8 J	20.3 J	7.4	7.2	24.8	25.9	18.8
Copper	44.9 J	37.8 J	13.6 J	71 J	493 J	36 J	39.5 J	NA	NA	NA	NA	NA
Lead	9 J	4.3 J	2.5	0.91 J	5.2 J	27.4 J	0.62 U	NA	NA	NA	NA	NA
Mercury	0.13	0.032 J	0.04 U	0.038 U	0.043 U	0.093	0.042 U	NA	NA	NA	NA	NA
Nickel	9.4 J	5.3 J	1.6 J	6	26	5	5.6	NA	NA	NA	NA	NA
Selenium	2.4 J	1.1 J	0.59 J	0.41 J	2.6 J	1.8 J	0.33 J	NA	NA	NA	NA	NA
Silver	0.58 U	0.56 U	0.6 U	0.53 U	3 U	0.57 U	0.62 U	NA	NA	NA	NA	NA
Thallium	0.2 J	0.076 J	0.6 U	0.036 J	3 U	0.066 J	0.62 U	NA	NA	NA	NA	NA
Tin	5.7 U	5.3 U	5.8 U	5.9 U	5.9 U	5.7 U	6.2 U	NA	NA	NA	NA	NA
Vanadium	325 J	188 J	105 J	161 J	821 J	174 J	196 J	NA	NA	NA	NA	NA
Zinc	72.7 J	36.8 J	40 J	68.3	298	64.6	56.8	NA	NA	NA	NA	NA
Wet Chemistry												
% Solids (pct)	NA	NA	NA	NA	NA	NA	NA	88	88	83	82	84
Total Petroleum Hydrocarbons ()												
Diesel fuel (UG/KG)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Identification of Gasoline (UG/KG)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	12,000 U	11,000 U	12,000 U	14,000	14,000	16,000	20,000	NA	NA	NA	NA	NA
TPH-gas range (UG/KG)	580 U	560 U	600 U	570 U	650 U	580 U	630 U	NA	NA	NA	NA	NA

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TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67GW06			67GW07		67GW08		67SB09		67SB09R		67SB10
Sample ID	67SB06-01	67SB06-01D	67SB06-05	67SB07-01	67SB07-05	67SB08-01	67SB08-05	NAPR-W67-SB09-0507	NAPR-W67-SB09P-0507	NAPR-W67-SB09R-0507	NAPR-W67-SB09RP-0507	NAPR-W67-SB10-0507
Sample Date	03/23/10	03/23/10	03/23/10	03/23/10	03/23/10	03/22/10	03/22/10	01/24/14	01/24/14	07/03/14	07/03/14	07/03/14
Chemical Name												

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

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

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct - Percent

µg/kg - Micrograms per kilogram

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67SB11	67SB12		67SB13	67SB14
Sample ID	NAPR-W67-SB11-0507	NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date	07/03/14	07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name					
Volatile Organic Compounds (µg/kg)					
1,1,1,2-Tetrachloroethane	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA
2-Chloro-1,3-butadiene	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA
Acetonitrile	NA	NA	NA	NA	NA
Acrolein	NA	NA	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA
Allyl chloride	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA
Dibromomethane	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA
Ethyl methacrylate	NA	NA	NA	NA	NA
Iodomethane	NA	NA	NA	NA	NA
Isobutanol	NA	NA	NA	NA	NA
Methacrylonitrile	NA	NA	NA	NA	NA
m- and p-Xylene	NA	NA	NA	NA	NA
Methyl methacrylate	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA	NA
Propionitrile	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA
trans-1,4-Dichloro-2-butene	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA
Trichlorofluoromethane (Freon-11)	NA	NA	NA	NA	NA
Vinyl acetate	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA
Xylene, total	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (µg/kg)					
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA
1,4-Dioxane	NA	NA	NA	NA	NA
1,4-Naphthoquinone	NA	NA	NA	NA	NA
1-Naphthylamine	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	NA	NA	NA	NA	NA

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67SB11	67SB12		67SB13	67SB14
Sample ID	NAPR-W67-SB11-0507	NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date	07/03/14	07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name					
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA
2,6-Dichlorophenol	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA
2-Acetylaminofluorene	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA
2-Methyl-5-nitroaniline	NA	NA	NA	NA	NA
2-Methylaniline	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA
2-Naphthylamine	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA
3,3'-Dimethylbenzidine	NA	NA	NA	NA	NA
3-Methylcholanthrene	NA	NA	NA	NA	NA
3-Methylphenol	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA
4-Aminobiphenyl	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA
4-Methylphenol	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA
4-Nitrophenol	NA	NA	NA	NA	NA
4-Nitroquinoline-1-oxide	NA	NA	NA	NA	NA
7,12-Dimethylbenz(a)anthracene	NA	NA	NA	NA	NA
a,a-Dimethylphenethylamine	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA
Aniline	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA
Aramite	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA
Benzyl alcohol	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA
Ethyl methanesulfonate	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA
Hexachlorophene	NA	NA	NA	NA	NA
Hexachloropropene	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA

TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67SB11	67SB12		67SB13	67SB14
Sample ID	NAPR-W67-SB11-0507	NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date	07/03/14	07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name					
Isophorone	NA	NA	NA	NA	NA
Isosafrole	NA	NA	NA	NA	NA
Methapyrilene	NA	NA	NA	NA	NA
Methyl methanesulfonate	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA
n-Nitrosodiethylamine	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	NA	NA	NA	NA	NA
n-Nitroso-di-n-butylamine	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA
N-Nitrosomorpholine	NA	NA	NA	NA	NA
n-Nitroso-n-methylethylamine	NA	NA	NA	NA	NA
N-Nitrosopiperidine	NA	NA	NA	NA	NA
n-Nitrosopyrrolidine	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA
O,O,O-Triethyl phosphorothioate	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	NA	NA	NA	NA	NA
Pentachlorobenzene	NA	NA	NA	NA	NA
Pentachloroethane	NA	NA	NA	NA	NA
Pentachloronitrobenzene	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA
Phenacetin	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA
p-Phenylenediamine	NA	NA	NA	NA	NA
Pronamide	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA
Safrole	NA	NA	NA	NA	NA
Herbicides (µg/kg)					
cis-Diallate	NA	NA	NA	NA	NA
trans-Diallate	NA	NA	NA	NA	NA
Diallate	NA	NA	NA	NA	NA
Dinoseb	NA	NA	NA	NA	NA
Explosives (µg/kg)					
1,3,5-Trinitrobenzene	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA	NA
Total Metals (mg/kg)					
Antimony	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA
Cobalt	26.1	36.2	29.3	36.5	25.5
Copper	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA
Tin	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA
Wet Chemistry					
% Solids (pct)	87	82	77	87	84
Total Petroleum Hydrocarbons ()					
Diesel fuel (UG/KG)	NA	NA	NA	NA	NA
Specific Identification of Gasoline (UG/KG)	NA	NA	NA	NA	NA
TPH-diesel range (UG/KG)	NA	NA	NA	NA	NA
TPH-gas range (UG/KG)	NA	NA	NA	NA	NA

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TABLE D-2

Phase I RFI Subsurface Soil Analytical Results

SWMU 67 Phase I RFI Report

Naval Activity Puerto Rico

Station ID	67SB11	67SB12		67SB13	67SB14
Sample ID	NAPR-W67-SB11-0507	NAPR-W67-SB12-0507	NAPR-W67-SB12-0709	NAPR-W67-SB13-0507	NAPR-W67-SB14-0507
Sample Date	07/03/14	07/03/14	07/03/14	07/03/14	07/03/14
Chemical Name					

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

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

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pct - Percent

µg/kg - Micrograms per kilogram

TABLE D-3

Phase I RFI Groundwater Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID	13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Chemical Name											
Volatile Organic Compounds (µg/l)											
1,1,1,2-Tetrachloroethane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,2-Dibromo-3-chloropropane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,2-Dichloroethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,4-Dichlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2-Butanone	10 U	10 U	2.5 R	2.5 R	2.5 R	2.5 R	5.2 J	2.5 R	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	10 U	10 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-Methyl-2-pentanone	10 U	10 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	8 J	7 J	11 J	12 J	2.5 R	7.9 J	30 J	6 J	3.9 R	2.5 R	2.5 R
Acetonitrile	40 U	40 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	20 U	20 U	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R
Acrylonitrile	20 U	20 U	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R
Allyl chloride	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Benzene	1 U	1 U	0.031 J	0.5 U	0.5 U	0.5 U	0.11 J	0.053 J	0.5 U	0.5 U	0.5 U
Bromodichloromethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon disulfide	1 U	1.1	0.35 J	0.72	0.32 J	0.87	2.2	0.82	0.04 J	0.048 J	0.048 J
Carbon tetrachloride	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ
Chloroform	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Ethylbenzene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethyl methacrylate	1 U	1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane	1 U	1 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.25 J	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Isobutanol	40 U	40 U	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R
Methacrylonitrile	20 U	20 U	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U
m- and p-Xylene	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl methacrylate	1 U	1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene chloride	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Propionitrile	20 U	20 U	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R
Styrene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R	0.5 R
Tetrachloroethene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Trichloroethene	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon-11)	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl acetate	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, total	2 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds (µg/l)											
1,2,4,5-Tetrachlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,4-Dioxane	10 U	10 U	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R
1,4-Naphthoquinone	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1-Naphthylamine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
2,2'-Oxybis(1-chloropropane)	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2,3,4,6-Tetrachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U

TABLE D-3

Phase I RFI Groundwater Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID	13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Chemical Name											
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 R	10 R
2,4-Dinitrophenol	50 U	50 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2,6-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2-Acetylaminofluorene	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
2-Chloronaphthalene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 UJ	5.3 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2-Methyl-5-nitroaniline	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
2-Methylaniline	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
2-Methylnaphthalene	10 U	10 U	0.042 J	0.033 J	0.21 U	0.037 J	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2-Naphthylamine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
2-Nitroaniline	50 U	50 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
2-Picoline	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
3,3'-Dichlorobenzidine	20 U	20 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
3,3'-Dimethylbenzidine	20 U	20 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
3-Methylcholanthrene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
3-Methylphenol	NA	NA	8 U	8.4 U	8.4 U	8.2 U	8.9 U	8.2 U	8.9 U	8.4 U	8.4 U
3-Nitroaniline	50 U	50 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4,6-Dinitro-2-methylphenol	50 U	50 U	10 UJ	10 UJ	10 UJ	10 UJ	11 U	10 U	11 UJ	10 U	10 UJ
4-Aminobiphenyl	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
4-Bromophenyl-phenylether	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
4-Chloroaniline	20 U	20 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
4-Chlorophenyl-phenylether	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Methylphenol	10 U	10 U	8 U	8.4 U	8.4 U	8.2 U	8.9 U	8.2 U	8.9 U	8.4 U	8.4 U
4-Nitroaniline	50 U	50 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
4-Nitrophenol	50 U	50 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
4-Nitroquinoline-1-oxide	20 U	20 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
7,12-Dimethylbenz(a)anthracene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
a,a-Dimethylphenethylamine	2,000 U	2,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Acenaphthylene	10 U	10 U	0.2 U	0.046 J	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 UJ	0.21 UJ
Acetophenone	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Aniline	20 U	20 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 R	5.3 R
Anthracene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	5.3 U	5.3 U
Aramite	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Benzo(a)anthracene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 UJ	0.022 J
Benzo(a)pyrene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	5.3 UJ	5.3 UJ
Benzo(b)fluoranthene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.014 J
Benzo(g,h,i)perylene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Benzo(k)fluoranthene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.02 J
Benzyl alcohol	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
bis(2-Chloroethoxy)methane	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
bis(2-Chloroethyl)ether	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Butylbenzylphthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Chrysene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.027 J
Dibenz(a,h)anthracene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U
Dibenzofuran	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Diethylphthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Dimethyl phthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Di-n-butylphthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Di-n-octylphthalate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Ethyl methanesulfonate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Fluoranthene	10 U	10 U	0.01 J	0.034 J	0.016 J	0.01 J	0.017 J	0.015 J	0.22 U	0.21 U	0.035 J
Fluorene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.06 J	0.22 U	0.21 U	0.21 U
Hexachlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachlorobutadiene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachlorocyclopentadiene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachloroethane	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Hexachlorophene	5,000 U	5,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloropropene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 UJ	5.1 UJ	5.6 U	5.3 U	5.3 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.21 U

TABLE D-3

Phase I RFI Groundwater Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID	13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Chemical Name											
Isophorone	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Isosafrole	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Methapyrilene	2,000 U	2,000 U	5 R	5.3 R	5.3 R	5.1 R	5.6 R	5.1 R	5.6 R	5.3 R	5.3 R
Methyl methanesulfonate	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Naphthalene	10 U	10 U	0.2 U	0.21 U	0.21 U	0.21 U	0.22 U	0.21 U	1	0.21 U	0.21 U
n-Nitrosodiethylamine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
n-Nitrosodimethylamine	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
n-Nitroso-di-n-butylamine	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 UJ	5.1 UJ	5.6 U	5.3 UJ	5.3 U
n-Nitroso-di-n-propylamine	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
n-Nitrosodiphenylamine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
N-Nitrosomorpholine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
n-Nitroso-n-methylethylamine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
N-Nitrosopiperidine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
n-Nitrosopyrrolidine	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
Nitrobenzene	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 UJ	5.1 UJ	5.6 UJ	5.3 U	5.3 UJ
O,O,O-Triethyl phosphorothioate	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 R	5.3 R
Pentachlorobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Pentachloroethane	5 U	5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U
Pentachloronitrobenzene	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 U	5.6 UJ	5.3 U	5.3 UJ
Pentachlorophenol	50 U	50 U	10 UJ	10 UJ	10 UJ	10 UJ	11 U	10 U	11 UJ	10 U	10 UJ
Phenacetin	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Phenanthrene	10 U	10 U	0.2 U	0.068 J	0.21 U	0.21 U	0.22 U	0.042 J	0.22 U	0.21 U	0.21 U
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U
p-Phenylenediamine	2,000 U	2,000 U	51 R	54 R	54 R	52 R	57 R	52 R	57 R	54 R	54 R
Pronamide	10 U	10 U	10 U	10 U	10 U	10 U	11 U	10 U	11 U	10 R	10 R
Pyrene	10 U	10 U	0.2 U	0.019 J	0.21 U	0.21 U	0.22 U	0.21 U	0.22 U	0.21 U	0.033 J
Pyridine	50 U	50 U	5 U	5.3 U	5.3 U	5.1 U	1.6 J	5.1 U	5.6 U	5.3 U	5.3 U
Safrole	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Herbicides (µg/l)											
cis-Diallate	NA	NA	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 UJ	5.3 UJ
trans-Diallate	NA	NA	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 UJ	5.1 UJ	5.6 UJ	5.3 UJ	5.3 UJ
Diallate	10 U	10 U	5 UJ	5.3 UJ	5.3 UJ	5.1 UJ	5.6 U	5.1 UJ	5.6 U	5.3 UJ	5.3 UJ
Dinoseb	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Explosives (µg/l)											
1,3,5-Trinitrobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
1,3-Dinitrobenzene	10 U	10 U	5 U	5.3 U	5.3 U	5.1 U	5.6 U	5.1 U	5.6 U	5.3 U	5.3 U
Total Metals (µg/l)											
Antimony	NA	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.23 J	2 U
Arsenic	NA	NA	2.2	2.2	2.9	9.8	3.4	3	1.1	1.2	1.3
Barium	NA	NA	108	24.2	12.4	65.4	60.5	41.2	9 J	4.6 J	5.1 J
Beryllium	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	NA	NA	0.068 J	0.094 J	1 U	0.14 J	0.097 J	0.12 J	1 U	0.055 J	0.051 J
Chromium	NA	NA	1.7 J	0.52 J	0.37 J	1.4 J	3.6	1 J	0.45 J	0.44 J	0.46 J
Cobalt	NA	NA	10.4	4.4	4.7	5.5	6.2	2.7	0.66 J	2.6	2.7
Copper	20 U	3.2 B	24.5	7.6	7.4	23.2	16	15.5	5.8	5.6	5.1
Cyanide	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Mercury	NA	NA	0.19 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	NA	NA	3.9	4	3.3	6.3	5.7	3.8	1 U	1.4	1.4
Selenium	NA	NA	7.3	4.5 J	5.3	37.2	12.8	9.6	5.8	7.6	7.8
Silver	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Thallium	NA	NA	0.2 J	0.37 J	0.13 J	0.38 J	0.16 J	0.29 J	1 U	0.051 J	1 U
Tin	NA	NA	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Vanadium	NA	NA	15	9.4	87.3	38.4	10.2	13.4	41.4	49.5	52.7
Zinc	NA	NA	9.2	13	7.6	15.4	14.3	9.3	3.3	2.4	2.2
Dissolved Metals (µg/l)											
Antimony, Dissolved	20 U	20 U	0.48 J	0.35 J	0.41 J	0.48 J	0.84 J	0.52 J	2 U	2 U	2 U
Arsenic, Dissolved	10 U	10 U	2.3	2.1	3.1	6.4	4.6	3	1.2	1.3	1.1
Barium, Dissolved	6.1 B	43	84.9	13.6	12.3	36.7	52.7	39.5	9.6 J	4.8 J	4.8 J
Beryllium, Dissolved	4 U	4 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	5 U	5 U	0.1 J	0.053 J	1 U	0.066 J	0.76 J	0.061 J	1 U	0.062 J	0.059 J
Chromium, Dissolved	10 U	10 U	0.48 J	2 U	0.28 J	0.6 J	0.77 J	0.73 J	0.45 J	0.34 J	0.49 J
Cobalt, Dissolved	10 U	1.4 B	6.6	3.3	4.5	2.6	35.7	2.3	0.64 J	2.4	2.5
Copper, Dissolved	NA	NA	42.5	19.2	17.5	36.3	31.3	29.3	11.3	5	9.5

TABLE D-3

Phase I RFI Groundwater Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Station ID	13E-SB02	13E-SB03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	
Sample ID	13E-GW02	13E-GW03	67GW01	67GW02	67GW03	67GW04	67GW05	67GW06	67GW07	67GW08	67GW08D
Sample Date	05/10/04	05/10/04	03/27/10	03/28/10	03/30/10	03/28/10	03/27/10	03/27/10	03/26/10	03/26/10	03/26/10
Chemical Name											
Lead, Dissolved	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Mercury, Dissolved	1.2 B	4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	2.3 B	4 B	3.3	3.3	3.7	3.7	45.8	3.3	0.88 J	1.3	1.5
Selenium, Dissolved	10 U	10 U	7.6	4.1 J	6	23.7	17.3	10.1	6.3	8.1	7.9
Silver, Dissolved	5 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Thallium, Dissolved	10 U	10 U	0.34 J	0.39 J	0.15 J	0.26 J	0.61 J	0.27 J	1 U	1 U	1 U
Tin, Dissolved	50 U	50 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Vanadium, Dissolved	67	38	8.6 J	8.1 J	90.9 J	21.4 J	8.3 J	12.6 J	45.5 J	52.8 J	53.2 J
Zinc, Dissolved	3.3 B	5.8 B	7.3	6.9	5	5.2	181	8.4	2.3	2.5	2.1
Wet Chemistry											
Sulfide (mg/l)	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons ()											
Diesel fuel (UG/L)	810	710	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Identification of Gasoline (UG/L)	14 J	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-diesel range (UG/L)	NA	NA	500 U	500 U	530 U	500 U	500 U	540 U	500 U	500 U	560 U
TPH-gas range (UG/L)	NA	NA	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U

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Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

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

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/l - Milligrams per liter

µg/l - Micrograms per liter

TABLE D-4

Phase I RFI Surface Water Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Site ID	67SW03
Sample ID	67SW03
Sample Date	3/22/2010
Chemical Name	
Volatiles (µg/L)	
1,1,1,2-Tetrachloroethane	0.5 UJ
1,1,1-Trichloroethane	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ
1,1,2-Trichloroethane	0.5 U
1,1-Dichloroethane	0.5 U
1,1-Dichloroethene	0.5 U
1,2,3-Trichloropropane	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U
1,2-Dichloroethane	0.5 U
1,2-Dichloroethene (trans)	0.5 U
1,2-Dichloropropane	0.5 U
1,3-Dichloropropene (cis)	0.5 U
1,3-Dichloropropene (trans)	0.5 U
1,4-Dichloro-2-butene (trans)	2 U
1,4-Dioxane (p-)	25 R
2-Butanone (MEK)	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U
2-Hexanone (MBK)	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U
Acetone	2.5 R
Acetonitrile	0.5 UJ
Acrolein	5 R
Acrylonitrile	5 R
Benzene	0.5 U
Bromodichloromethane	0.5 U
Bromoform	0.5 U
Bromomethane	0.5 UJ
Carbon Disulfide	0.5 U
Carbon Tetrachloride	0.5 U
Chlorobenzene	0.5 U
Chloroethane	0.5 UJ
Chloroform	0.5 U
Chloromethane	0.5 U
Dibromochloromethane	0.5 UJ
Dibromomethane	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ
Ethyl Methacrylate	5 U
Ethylbenzene	0.5 U
Isobutyl Alcohol	25 R
Methyl Acrylonitrile	5 U
Methyl Iodide	0.5 UJ
Methyl Methacrylate	5 U
Methylene Chloride	0.5 U
Pentachloroethane	0.5 U
Propionitrile (Ethyl Cyanide)	25 R
Styrene (Ethenylbenzene)	0.5 U
Tetrachloroethene (PCE)	0.5 U
Toluene	0.5 U
Trichloroethene (TCE)	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U
Vinyl Acetate	1 U
Vinyl Chloride	0.5 U
Xylene, m/p-	1 U
Xylene, o-	0.5 U
Xylenes, total	0.5 U
Semivolatiles (µg/L)	
1,2,4,5-Tetrachlorobenzene	5 U
1,2,4-Trichlorobenzene	5 U
1,2-Dichlorobenzene (o-)	5 U
1,3,5-Trinitrobenzene (TNB)	5 U
1,3-Dichlorobenzene (m-)	5 U
1,3-Dinitrobenzene (m-)	5 U
1,4-Dichlorobenzene (p-)	5 U
1,4-Naphthoquinone	5 U
1,4-Phenylenediamine	51 R
1-Naphthylamine	5 UJ
2,2'-Oxybis[1-chloropropane]	5 U
2,3,4,6-Tetrachlorophenol	10 U
2,4,5-Trichlorophenol	10 U
2,4,6-Trichlorophenol	10 U
2,4-Dichlorophenol	10 U
2,4-Dimethylphenol	10 U
2,4-Dinitrophenol	10 U

TABLE D-4

Phase I RFI Surface Water Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Site ID	67SW03
Sample ID	67SW03
Sample Date	3/22/2010
Chemical Name	
2,4-Dinitrotoluene (DNT)	5 U
2,6-Dichloropheno	10 U
2,6-Dinitrotoluene (DNT)	5 U
2-Acetylaminofluorene	5 UJ
2-Chloronaphthalene	5 U
2-Chloropheno	10 U
2-Methyl-5-nitroaniline	5 UJ
2-Methylphenol (o-Cresol)	10 U
2-Naphthylamine	5 UJ
2-Nitroaniline	5 U
2-Nitrophenol	10 U
2-Picoline	5 UJ
3,3'-Dichlorobenzidine	5 U
3,3'-Dimethylbenzidine	5 UJ
3-Methylcholanthrene	5 U
3-Methylphenol (m-Cresol)	8 U
3-Nitroaniline	5 U
4,6-Dinitro-2-methylpheno	10 U
4-Aminobipheny	5 UJ
4-Bromophenyl-phenylether	5 U
4-Chloro-3-methylpheno	10 U
4-Chloroaniline	5 U
4-Chlorophenyl-phenylethe	5 U
4-Dimethylaminoazobenzene (p-)	5 UJ
4-Methylphenol (p-Cresol)	8 U
4-Nitroaniline	5 U
4-Nitrophenol	10 U
4-Nitroquinoline-1-oxide	5 UJ
7,12-Dimethylbenz(a)anthracene	5 U
Acetophenone	5 U
Aniline	5 U
Aramite	5 U
Benzyl Alcoho	5 U
Bis(2-chloroethoxy)methane	5 U
Bis(2-chloroethyl)ether	5 U
Bis(2-ethylhexyl) Phthalate (BEHP)	5 U
Butyl Benzyl Phthalate	5 U
Diallate (cis)	5 UJ
Diallate (total)	5 UJ
Diallate (trans)	5 UJ
Dibenzofuran	5 U
Diethyl Phthalate (DEP)	5 U
Dimethyl Phthalate	5 U
Di-n-butyl Phthalate (DBP)	5 U
Di-n-octyl Phthalate	5 U
Dinoseb	5 U
Ethyl Methane Sulfonate (EMS)	5 U
Hexachloro-1,3-butadiene	5 U
Hexachlorobenzene	5 U
Hexachlorocyclopentadiene	5 U
Hexachloroethane	5 U
Hexachloropropene	5 UJ
Indeno(1,2,3-cd)pyrene	5 UJ
Isophorone	5 U
Isosafrole	5 U
Methapyrilene	5 UJ
Methyl Methane Sulfonate	5 U
Nitrobenzene	5 U
n-Nitrosodiethylamine	5 UJ
n-Nitrosodimethylamine (NDMA)	5 U
n-Nitroso-di-n-butylamine	5 UJ
n-Nitrosodi-n-propylamine	5 U
n-Nitrosodiphenylamine	5 UJ
n-Nitrosomethylethylamine	5 UJ
n-Nitrosomorpholine	5 UJ
n-Nitrosopiperidine	5 UJ
n-Nitrosopyrrolidine	5 UJ
o-Toluidine	5 UJ
Pentachlorobenzene	5 U
Pentachloronitrobenzene	5 U
Pentachloropheno	10 U
Phenacetin	5 U
Phenol	10 U
Pronamide	10 U
Pyridine	5 U
Safrole	5 U

TABLE D-4

Phase I RFI Surface Water Analytical Results

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

Site ID	67SW03
Sample ID	67SW03
Sample Date	3/22/2010
Chemical Name	
PAHs (µg/L) - Low Molecular Weight	
2-Methylnaphthalene	0.2 U
Acenaphthene	0.2 U
Acenaphthylene	0.2 U
Anthracene	0.2 U
Fluoranthene	0.2 U
Fluorene	0.2 U
Naphthalene	0.072 J
Phenanthrene	0.2 U
PAHs (µg/L) - High Molecular Weight	
Benzo(a)anthracene	0.2 U
Benzo(a)pyrene (BaP)	0.2 U
Benzo(b)fluoranthene	0.2 U
Benzo(g,h,i)perylene	0.2 U
Benzo(k)fluoranthene	0.2 U
Chrysene	0.2 U
Dibenz(a,h)anthracene	0.2 U
Indeno(1,2,3-cd)pyrene	0.2 U
Pyrene	0.2 U
PAH totals (µg/L)	
Low molecular weight PAHs	1.472
High molecular weight PAHs	1.8
TPH (mg/L)	
Diesel Range Organics (DRO)	0.54 U
Gasoline Range Organics (GRO)	0.5 U
Total TPH	1.04 U
Dissolved Inorganics (µg/L)	
Antimony	0.45 J
Arsenic	1 U
Barium	38
Beryllium	1 U
Cadmium	1 U
Chromium	0.33 J
Cobalt	0.13 J
Copper	6
Lead	0.091 J
Mercury	0.2 U
Nickel	0.89 J
Selenium	4.2 J
Silver	1 U
Thallium	1 U
Tin	20 U
Vanadium	8.2 J
Zinc	3
Total Inorganics (µg/L)	
Antimony	0.4 J
Arsenic	0.74 J
Barium	38
Beryllium	1 U
Cadmium	1 U
Chromium	0.44 J
Cobalt	0.27 J
Copper	5.8
Lead	0.23 J
Mercury	0.2 U
Nickel	0.78 J
Selenium	3.8 J
Silver	1 U
Thallium	1 U
Tin	20 U
Vanadium	8.8
Zinc	5.6 J

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is qualified as estimated
J - Analyte present - Reported value is estimated
R - Result is rejected and unusable

TABLE D-5

Phase I RFI Quality Assurance/Quality Control Analytical Data

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

	Equipment Rinsate Blanks										Field Blanks		Trip Blanks				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08	EB01-012414	EB01-070314	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010	1/24/2014	7/3/2014	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Chemical Name																	
Volatiles (µg/L)																	
1,1,1,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
1,2-Dibromoethane (EDB)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (cis)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (trans)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichloro-2-butene (trans)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,4-Dioxane (p-)	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	NA	NA	25 R	25 R	25 R	25 R	25 R	25 R	25 R
2-Butanone (MEK)	2.5 R	2.5 R	2 J	2.5 J	2.5 R	2.1 J	2.4 J	1.5 J	NA	NA	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R
2-Chloro-1,3-butadiene (Chloroprene)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone (MBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
3-Chloropropene (Allyl Chloride)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
4-Methyl-2-pentanone (MIBK)	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	3.5 J	3.2 J	2.7 J	3.9 J	5.1 J	3.1 J	4.9 J	4 J	NA	NA	3.7 J	5.1 J	2.5 R	2.5 R	2.5 R	2.5 R	2.5 R
Acetonitrile	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Acrolein	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R	NA	NA	5 R	5 R	5 R	5 R	5 R	5 R	5 R
Acrylonitrile	5 R	5 R	5 R	5 R	5 R	5 R	5 R	5 R	NA	NA	5 R	5 R	5 R	5 R	5 R	5 R	5 R
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.034 J	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.092 J	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon Tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U
Chloroform	1.4	1.3	0.97	1	0.5 U	1.2	0.46 J	0.2 J	NA	NA	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon-12)	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Ethyl Methacrylate	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isobutyl Alcohol	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	NA	NA	25 R	25 R	25 R	25 R	25 R	25 R	25 R
Methyl Acrylonitrile	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 UJ	5 U	NA	NA	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 UJ
Methyl Iodide	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

TABLE D-5

Phase I RFI Quality Assurance/Quality Control Analytical Data

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

	Equipment Rinsate Blanks										Field Blanks		Trip Blanks				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08	EB01-012414	EB01-070314	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010	1/24/2014	7/3/2014	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Chemical Name																	
Volatiles (µg/L)																	
Methyl Methacrylate	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methylene Chloride	1.5	1.3	1.1	1.1	0.18 J	0.9	0.52	3.8	NA	NA	1.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Pentachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
Propionitrile (Ethyl Cyanide)	25 R	25 R	25 R	25 R	25 R	25 R	25 R	25 R	NA	NA	25 R	25 R	25 R	25 R	25 R	25 R	25 R
Styrene (Ethenylbenzene)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene (PCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.95	0.81	0.5	0.53	0.08 J	0.22 J	0.14 J	1	NA	NA	0.97	0.054 J	0.5 U	0.5 U	0.5 U	0.037 J	0.037 J
Trichloroethene (TCE)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon 11)	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Acetate	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, m/p-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 J	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.076 J	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylenes, total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.13 J	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatiles (µg/L)																	
1,2,4,5-Tetrachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,2-Dichlorobenzene (o-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene (TNB)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,3-Dichlorobenzene (m-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,3-Dinitrobenzene (m-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene (p-)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,4-Naphthoquinone	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
1,4-Phenylenediamine	52 R	54 R	57 R	57 R	51 R	52 R	52 R	51 R	NA	NA	52 R	55 R	NA	NA	NA	NA	NA
1-Naphthylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
2,2'-Oxybis[1-chloropropane]	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4-Dichlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4-Dimethylphenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4-Dinitrophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,4-Dinitrotoluene (DNT)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
2,6-Dichlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2,6-Dinitrotoluene (DNT)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
2-Acetylaminofluorene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
2-Chloronaphthalene	5.1 U	5.3 U	5.6 UJ	5.6 UJ	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 UJ	NA	NA	NA	NA	NA
2-Chlorophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2-Methyl-5-nitroaniline	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
2-Methylphenol (o-Cresol)	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2-Naphthylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
2-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA

TABLE D-5

Phase I RFI Quality Assurance/Quality Control Analytical Data

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

	Equipment Rinsate Blanks										Field Blanks		Trip Blanks				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08	EB01-012414	EB01-070314	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010	1/24/2014	7/3/2014	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Chemical Name																	
Semivolatiles (µg/L)																	
2-Nitrophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
2-Picoline	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
3,3'-Dimethylbenzidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
3-Methylcholanthrene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
3-Methylphenol (m-Cresol)	8.2 U	8.4 U	8.9 U	8.9 U	8 U	8.2 U	8.2 U	8 U	NA	NA	8.2 U	8.6 U	NA	NA	NA	NA	NA
3-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	10 U	10 U	11 U	11 U	10 UJ	10 UJ	10 UJ	10 UJ	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
4-Aminobiphenyl	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
4-Chloroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
4-Dimethylaminoazobenzene (p-)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
4-Methylphenol (p-Cresol)	8.2 U	8.4 U	8.9 U	8.9 U	8 U	8.2 U	8.2 U	8 U	NA	NA	8.2 U	8.6 U	NA	NA	NA	NA	NA
4-Nitroaniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
4-Nitrophenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
4-Nitroquinoline-1-oxide	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
7,12-Dimethylbenz(a)anthracene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Acetophenone	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Aniline	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Aramite	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Benzyl Alcohol	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Bis(2-chloroethyl)ether	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) Phthalate (BEHP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Butyl Benzyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Diallate (cis)	5.1 UJ	5.3 UJ	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 UJ	5.4 U	NA	NA	NA	NA	NA
Diallate (total)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
Diallate (trans)	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
Dibenzofuran	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Diethyl Phthalate (DEP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Dimethyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Di-n-butyl Phthalate (DBP)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Di-n-octyl Phthalate	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Dinoseb	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Ethyl Methane Sulfonate (EMS)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Hexachloro-1,3-butadiene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Hexachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Hexachloroethane	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Hexachloropropene	5.1 UJ	5.3 UJ	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 UJ	5.4 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA

TABLE D-5

Phase I RFI Quality Assurance/Quality Control Analytical Data

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

	Equipment Rinsate Blanks										Field Blanks		Trip Blanks				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08	EB01-012414	EB01-070314	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010	1/24/2014	7/3/2014	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Chemical Name																	
Semivolatiles (µg/L)																	
Isophorone	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Isosafrole	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Methapyrilene	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 R	5.1 R	5.1 R	5 R	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
Methyl Methane Sulfonate	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Nitrobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
n-Nitrosodiethylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosodimethylamine (NDMA)	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
n-Nitroso-di-n-butylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosodi-n-propylamine	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosomethylethylamine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosomorpholine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosopiperidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
n-Nitrosopyrrolidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
o-Toluidine	5.1 UJ	5.3 UJ	5.6 UJ	5.6 UJ	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 UJ	5.4 UJ	NA	NA	NA	NA	NA
Pentachlorobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Pentachloronitrobenzene	5.1 U	5.3 U	5.6 U	5.6 U	5 UJ	5.1 UJ	5.1 UJ	5 UJ	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Pentachlorophenol	10 U	10 U	11 U	11 U	10 UJ	10 UJ	10 UJ	10 UJ	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
Phenacetin	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Phenol	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
Pronamide	10 U	10 U	11 U	11 U	10 U	10 U	10 U	10 U	NA	NA	10 U	11 U	NA	NA	NA	NA	NA
Pyridine	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
Safrole	5.1 U	5.3 U	5.6 U	5.6 U	5 U	5.1 U	5.1 U	5 U	NA	NA	5.1 U	5.4 U	NA	NA	NA	NA	NA
PAHs (µg/L) - Low Molecular Weight																	
2-Methylnaphthalene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.016 J	0.21 U	0.02 J	NA	NA	0.021 J	0.22 U	NA	NA	NA	NA	NA
Acenaphthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Acenaphthylene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Fluorene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Naphthalene	0.097 J	0.093 J	0.08 J	0.061 J	0.2 U	0.074 J	0.04 J	0.11 J	NA	NA	0.098 J	0.22 U	NA	NA	NA	NA	NA
Phenanthrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
PAHs (µg/L) - High Molecular Weight																	
Benzo(a)anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Benzo(a)pyrene (BaP)	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.21 U	0.21 U	0.22 U	0.22 U	0.01 J	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Chrysene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA
Pyrene	0.21 U	0.21 U	0.22 U	0.22 U	0.2 U	0.21 U	0.21 U	0.2 U	NA	NA	0.21 U	0.22 U	NA	NA	NA	NA	NA

TABLE D-5

Phase I RFI Quality Assurance/Quality Control Analytical Data

SWMU 67 Revised Phase I RFI Report

Naval Activity Puerto Rico

	Equipment Rinsate Blanks										Field Blanks		Trip Blanks				
Sample ID	67ER01	67ER02	67ER03	67ER04	67ER05	67ER06	67ER07	67ER08	EB01-012414	EB01-070314	67FB01	67FB02	67TB01	67TB02	67TB03	67TB04	67TB05
Sample Date	3/22/2010	3/23/2010	3/24/2010	3/25/2010	3/26/2010	3/27/2010	3/28/2010	3/30/2010	1/24/2014	7/3/2014	3/23/2010	3/25/2010	3/22/2010	3/24/2010	3/26/2010	3/26/2010	3/30/2010
Chemical Name																	
PAH totals (µg/L)																	
Low molecular weight PAHs	1.567	1.563	1.62	1.601	1.6	1.35	1.51	1.33	NA	NA	1.379	1.76	NA	NA	NA	NA	NA
High molecular weight PAHs	1.89	1.89	1.98	1.98	1.61	1.89	1.89	1.8	NA	NA	1.89	1.98	NA	NA	NA	NA	NA
TPH (mg/L)																	
Diesel Range Organics (DRO)	0.5 U	0.5 U	0.5 U	0.53 U	0.51 U	0.54 U	0.5 U	0.5 U	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	0.03 J	0.03 J	0.03 J	0.03 J	0.04 J	0.03 J	0.035 J	0.033 J	NA	NA	0.032 J	0.032 J	0.033 J	0.032 J	0.03 J	0.036 J	0.032 J
Total TPH	0.53 J	0.53 J	0.53 J	0.56 J	0.55 J	0.57 J	0.535 J	0.533 J	NA	NA	0.532 J	0.532 J	0.033 J	0.032 J	0.03 J	0.036 J	0.032 J
Total Inorganics (µg/L)																	
Antimony	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	2 U	NA	NA	NA	NA	NA
Arsenic	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Barium	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	10 U	10 U	NA	NA	NA	NA	NA
Beryllium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Cadmium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Chromium	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	2 U	NA	NA	NA	NA	NA
Cobalt	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.3 U	0.3 U	1 U	1 U	NA	NA	NA	NA	NA
Copper	0.53 J	0.3 J	2 U	2 U	2 U	2 U	1.3 J	0.45 J	NA	NA	2 U	0.27 J	NA	NA	NA	NA	NA
Lead	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	0.074 J	NA	NA	NA	NA	NA
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA
Nickel	1 U	1 U	1 U	1 U	1 U	1 U	0.22 J	1 U	NA	NA	1 U	0.11 J	NA	NA	NA	NA	NA
Selenium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Thallium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA	NA
Tin	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	NA	NA	20 U	20 U	NA	NA	NA	NA	NA
Vanadium	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	5 U	5 U	NA	NA	NA	NA	NA
Zinc	0.61 J	0.83 J	1 J	0.99 J	0.98 J	2 U	1.8 J	2 U	NA	NA	2.3	1.2 J	NA	NA	NA	NA	NA

Notes:

µg/L - micrograms per liter
mg/L - milligrams per liter
PAH - Polyaromatic Hydrocarbons
TPH - Total Petroleum Hydrocarbons
U - Not detected
UJ - Reported quantitation limit is estimated
J - Analyte present - value is estimated
R - Result is rejected and unusable

SW846 - METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

67IDW01

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003249

Matrix (soil/water): LEACHATE Lab Sample ID: 1003249-01

Level (low/med): LOW Date Received: 3/31/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	14.8	B		P
7440-39-3	Barium	318	B		P
7440-43-9	Cadmium	2.3	B		P
7440-47-3	Chromium	0.75	U		P
7439-92-1	Lead	3.8	B		P
7439-97-6	Mercury	0.09	U		CV
7782-49-2	Selenium	18.2	B		P
7440-22-4	Silver	0.64	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

67IDW01

Lab Name: COMPUCHEM Method: 8260B-1311S

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003249

Matrix: (soil/water) LEACHATE Lab Sample ID: 1003249-01

Sample wt/vol: 5 (g/ml) ML Lab File ID: 1003249-0159

Level: (low/med) LOW Date Received: 03/31/10

% Moisture: not dec. _____ Date Analyzed: 04/15/10

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 5.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	25	U
75-35-4	1,1-Dichloroethene	25	U
78-93-3	2-butanone	63	U
67-66-3	Chloroform	25	U
56-23-5	Carbon Tetrachloride	25	U
71-43-2	Benzene	25	U
107-06-2	1,2-Dichloroethane	25	U
79-01-6	Trichloroethene	1.7	J
127-18-4	Tetrachloroethene	25	U
108-90-7	Chlorobenzene	25	U

FORM I VOA

CompuChem
A Division Of
Liberty Analytical Corp.

BAKER ENVIRONMENTAL, INC.	Project: NAPR SWMU67/DO#119197.6.8 ON ISLAND	
AIRSIDE BUSINESS PARK 100 AIRSIDE DRIVE	Project Number: NAPR SWMU67/DO#119197.6.8 ON ISLAND	Reported:
MOON TOWNSHIP PA, 15108	Project Manager: MARK KIMES	04/19/2010 15:34

67IDW01
1003249-02 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			COMPUCHEM					
***** DEFAULT GENERAL METHOD *****								
% Solids	85	0	% by Weight	1	0040607	04/06/2010 10:55	04/06/2010 11:00	% Calculation
WET CHEMISTRY PARAMETERS								
Corrosivity-pH	7.83		pH Units	1	0040536	04/05/2010 15:42	04/06/2010 15:26	EPA 9040B
Ignitability by Flashpoint	>140		degree F	1	0040537	04/05/2010 15:42	04/06/2010 15:29	EPA 1010
Reactive Cyanide	ND	250	mg/L	1	0040530	04/05/2010 15:33	04/06/2010 15:31	EPA 9014
Reactive Sulfide	ND	250	mg/L	1	0040535	04/05/2010 15:41	04/06/2010 15:33	EPA 9034

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Preeti Khare For Cathy Dover, Project Manager

SW846 - METALS

-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

67IDW02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003250

Matrix (soil/water): LEACHATE Lab Sample ID: 1003250-01

Level (low/med): LOW Date Received: 3/31/2010

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.5	U		P
7440-39-3	Barium	24.1	B		P
7440-43-9	Cadmium	0.64	U		P
7440-47-3	Chromium	3.9	B		P
7439-92-1	Lead	6.6	B		P
7439-97-6	Mercury	0.09	U		CV
7782-49-2	Selenium	2.1	U		P
7440-22-4	Silver	0.64	U		P

Color Before: BROWN Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

67IDW02

Lab Name: COMPUCHEM Method: 8260B-1311W

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: 1003250

Matrix: (soil/water) LEACHATE Lab Sample ID: 1003250-01

Sample wt/vol: 5 (g/ml) ML Lab File ID: 1003250-01R59

Level: (low/med) LOW Date Received: 03/31/10

% Moisture: not dec. _____ Date Analyzed: 04/16/10

GC Column: SPB-624 ID: 0.32 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
78-93-3	2-butanone	13	U
67-66-3	Chloroform	0.95	J
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U
79-01-6	Trichloroethene	5.0	U
127-18-4	Tetrachloroethene	5.0	U
108-90-7	Chlorobenzene	5.0	U

FORM I VOA

CompuChem
A Division Of
Liberty Analytical Corp.

BAKER ENVIRONMENTAL, INC.	Project: NAPR SWMU67/DO#119197.6.8 ON ISLAND	
AIRSIDE BUSINESS PARK 100 AIRSIDE DRIVE	Project Number: NAPR SWMU67/DO#119197.6.8 ON ISLAND	Reported:
MOON TOWNSHIP PA, 15108	Project Manager: MARK KIMES	04/22/2010 16:51

67IDW02

1003250-02 (Water)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
			COMPUCHEM					
WET CHEMISTRY PARAMETERS								
Corrosivity-pH	7.38		pH Units	1	0040532	04/05/2010 15:36	04/06/2010 16:44	EPA 9040B
Ignitability by Flashpoint	>140		degree F	1	0040533	04/05/2010 15:36	04/06/2010 16:45	EPA 1010
Reactive Cyanide	ND	250	mg/L	1	0040534	04/05/2010 15:40	04/06/2010 16:46	EPA 9014
Reactive Sulfide	ND	250	mg/L	1	0040531	04/05/2010 15:35	04/06/2010 16:48	EPA 9034

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Preeti Khare For Cathy Dover, Project Manager

APPENDIX F
ECP Site 13

APPENDIX F.39

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB01	13E-SB02-05	13E-SB03
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05
Sample Date	05/08/04	05/08/04	05/08/04
Sample Depth (ft bgs)	7.00 - 9.00	9.00 - 11.00	9.00 - 11.00
Volatile Organic Compounds (ug/kg)			
Chloroform	6.2 U	5.9 U	6.5 U
Dichlorodifluoromethane	6.2 U	5.9 U	6.5 U
1,1-Dichloroethane	6.2 U	5.9 U	6.5 U
1,2-Dichloroethane	6.2 U	5.9 U	6.5 U
1,1-Dichloroethene	6.2 U	5.9 U	6.5 U
1,2-Dichloropropane	6.2 U	5.9 U	6.5 U
Ethyl benzene	6.2 U	5.9 U	6.5 U
Acrolein	120 U	120 U	130 U
Methylene chloride	6.2 U	5.9 U	6.5 U
1,1,2,2-Tetrachloroethane	6.2 U	5.9 U	6.5 U
Tetrachloroethene	6.2 U	5.9 U	2.4 J
Toluene	6.2 U	5.9 U	6.5 U
trans-1,2-Dichloroethene	6.2 U	5.9 U	6.5 U
1,1,1-Trichloroethane	6.2 U	5.9 U	6.5 U
1,1,2-Trichloroethane	6.2 U	5.9 U	6.5 U
2-Butanone	31 U	6.8 J	11 J
Chloroprene	6.2 U	5.9 U	6.5 U
2-Hexanone	31 U	30 U	32 U
Acrylonitrile	120 U	120 U	130 U
3-Chloro-1-propene	6.2 U	5.9 U	6.5 U
Benzene	6.2 U	5.9 U	6.5 U
Bromoform	6.2 U	5.9 U	6.5 U
Carbon tetrachloride	6.2 U	5.9 U	6.5 U
Chlorobenzene	6.2 U	5.9 U	2.9 J
Acetonitrile	250 U	240 U	260 U
1,2-Dibromo-3-chloropropane	12 U	12 U	13 U
Dibromomethane	6.2 U	5.9 U	6.5 U
trans-1,4-Dichloro-2-butene	12 U	12 U	13 U
cis-1,3-Dichloropropene	6.2 U	5.9 U	6.5 U
trans-1,3-Dichloropropene	6.2 U	5.9 U	6.5 U
Ethyl methacrylate	6.2 U	5.9 U	6.5 U
Iodomethane	6.2 U	5.9 U	6.5 U
Methacrylonitrile	120 U	120 U	130 U
Methyl methacrylate	6.2 U	5.9 U	6.5 U
Pentachloroethane	31 U	30 U	32 U
1,1,1,2-Tetrachloroethane	6.2 U	5.9 U	6.5 U
Trichlorofluoromethane	6.2 U	5.9 U	6.5 U
1,2,3-Trichloropropane	6.2 U	5.9 U	6.5 U
Vinyl chloride	6.2 U	5.9 U	6.5 U
Dibromochloromethane	6.2 U	5.9 U	6.5 U
Chloroethane	6.2 U	5.9 U	6.5 U
Acetone	62 U	44 J	43 J
Bromodichloromethane	6.2 U	5.9 U	6.5 U

APPENDIX F.39

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB01	13E-SB02-05	13E-SB03
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05
Sample Date	05/08/04	05/08/04	05/08/04
Sample Depth (ft bgs)	7.00 - 9.00	9.00 - 11.00	9.00 - 11.00
Volatile Organic Compounds (ug/kg) (Cont.)			
Bromomethane	6.2 U	5.9 U	6.5 U
Chloromethane	6.2 U	5.9 U	6.5 U
Carbon disulfide	6.2 U	5.9 U	6.5 U
1,2-Dibromoethane	6.2 U	5.9 U	6.5 U
Propionitrile	120 U	120 U	130 U
Isobutanol	250 U	240 U	260 U
4-Methyl-2-pentanone	31 U	30 U	32 U
Styrene	6.2 U	5.9 U	6.5 U
Trichloroethene	6.2 U	5.9 U	6.5 U
Vinyl acetate	12 U	12 U	13 U
Xylene	12 U	12 U	13 U
Semivolatile Organic Compounds (ug/kg)			
Phenol	420 U	410 U	480 U
bis(2-Chloroethoxy)methane	420 U	410 U	480 U
2,4,6-Trichlorophenol	420 U	410 U	480 U
bis(2-Chloroethyl)ether	420 U	410 U	480 U
bis(2-Chloroisopropyl)ether	420 U	410 U	480 U
bis(2-Ethylhexyl)phthalate	420 U	410 U	480 U
4-Bromophenylphenyl ether	420 U	410 U	480 U
Butylbenzylphthalate	420 U	410 U	480 U
2-Chloronaphthalene	420 U	410 U	480 U
4-Chlorophenyl phenyl ether	420 U	410 U	480 U
Chrysene	420 U	410 U	480 U
Dibenzo(a,h)anthracene	110 J	63 J	480 U
2-Chlorophenol	420 U	410 U	480 U
Acenaphthene	420 U	410 U	480 U
3,3'-Dichlorobenzidine	850 U	810 U	960 U
Diethylphthalate	420 U	410 U	480 U
Dimethyl phthalate	420 U	410 U	480 U
2,4-Dinitrotoluene	420 U	410 U	480 U
2,6-Dinitrotoluene	420 U	410 U	480 U
Di-n-octylphthalate	420 U	410 U	480 U
2,4-Dichlorophenol	420 U	410 U	480 U
Acenaphthylene	420 U	410 U	480 U
2-Methylnaphthalene	420 U	410 U	480 U
Fluoranthene	420 U	410 U	480 U
Fluorene	420 U	410 U	480 U
Hexachlorobenzene	420 U	410 U	480 U
Hexachlorobutadiene	420 U	410 U	480 U
Hexachlorocyclopentadiene	420 U	410 U	480 U
Hexachloroethane	420 U	410 U	480 U
Indeno(1,2,3-cd)pyrene	110 J	60 J	480 U

APPENDIX F.39

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB01	13E-SB02-05	13E-SB03
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05
Sample Date	05/08/04	05/08/04	05/08/04
Sample Depth (ft bgs)	7.00 - 9.00	9.00 - 11.00	9.00 - 11.00
Semivolatile Organic Compounds (ug/kg) (Cont.)			
Isophorone	420 U	410 U	480 U
Naphthalene	420 U	410 U	480 U
2,4-Dimethylphenol	420 U	410 U	480 U
Anthracene	420 U	410 U	480 U
4,6-Dinitro-2-methylphenol	2,200 U	2,100 U	2,500 U
Nitrobenzene	420 U	410 U	480 U
N-Nitrosodimethylamine	420 U	410 U	480 U
N-Nitrosodiphenylamine	420 U	410 U	480 U
Phenanthrene	420 U	410 U	480 U
Pyrene	420 U	410 U	480 U
1,2,4-Trichlorobenzene	420 U	410 U	480 U
4-Nitroquinoline-1-oxide	4,200 U	4,100 U	4,800 U
2,4-Dinitrophenol	2,200 U	2,100 U	2,500 U
Benzo(a)anthracene	420 U	410 U	480 U
Benzo(a)pyrene	420 U	410 U	480 U
2,6-Dichlorophenol	420 U	410 U	480 U
Benzo(b)fluoranthene	420 U	410 U	480 U
4-Aminobiphenyl	420 U	410 U	480 U
p-(Dimethylamino)azobenzene	420 U	410 U	480 U
7,12-Dimethylbenz(a)anthracene	420 U	410 U	480 U
3,3'-Dimethyl benzidine	2,200 U	2,100 U	2,500 U
alpha,alpha-Dimethylphenethylamine	86,000 U	83,000 U	97,000 U
1,4-Dioxane	420 U	410 U	480 U
n-Nitrosodi-n-propylamine	420 U	410 U	480 U
Aniline	420 U	410 U	480 U
Ethylmethanesulfonate	420 U	410 U	480 U
Acetophenone	420 U	410 U	480 U
Aramite	420 U	410 U	480 U
Hexachlorophene	220,000 U	210,000 U	250,000 U
Hexachloropropene	420 U	410 U	480 U
Isosafrole	420 U	410 U	480 U
Methapyrilene	86,000 U	83,000 U	97,000 U
3-Methylcholanthrene	420 U	410 U	480 U
Methyl methanesulfonate	420 U	410 U	480 U
1,4-Naphthoquinone	420 U	410 U	480 U
1-Naphthylamine	420 U	410 U	480 U
2-Naphthylamine	420 U	410 U	480 U
N-Nitrosodi-n-butylamine	420 U	410 U	480 U
N-Nitrosodiethylamine	420 U	410 U	480 U
N-Nitrosomethylethylamine	420 U	410 U	480 U
N-Nitrosomorpholine	420 U	410 U	480 U
N-Nitrosopiperidine	420 U	410 U	480 U
N-Nitrosopyrrolidine	420 U	410 U	480 U

APPENDIX F.39

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB01	13E-SB02-05	13E-SB03
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05
Sample Date	05/08/04	05/08/04	05/08/04
Sample Depth (ft bgs)	7.00 - 9.00	9.00 - 11.00	9.00 - 11.00
Semivolatile Organic Compounds (ug/kg) (Cont.)			
5-Nitro-o-toluidine	420 U	410 U	480 U
Pentachlorobenzene	420 U	410 U	480 U
Pentachloronitrobenzene	420 U	410 U	480 U
Phenacetin	420 U	410 U	480 U
2-Picoline	420 U	410 U	480 U
Pronamide	420 U	410 U	480 U
Pyridine	420 U	410 U	480 U
Safrole	420 U	410 U	480 U
1,2,4,5-Tetrachlorobenzene	420 U	410 U	480 U
2,3,4,6-Tetrachlorophenol	420 U	410 U	480 U
2,4,5-Trichlorophenol	420 U	410 U	480 U
1,3,5-Trinitrobenzene	420 U	410 U	480 U
2-Acetylaminofluorene	420 U	410 U	480 U
Dinoseb	420 U	410 U	480 U
4-Chloroaniline	850 U	810 U	960 U
4-Chloro-3-methylphenol	420 U	410 U	480 U
Benzo(g,h,i)perylene	120 J	75 J	480 U
Pentachlorophenol	2,200 U	2,100 U	2,500 U
Benzo(k)fluoranthene	420 U	410 U	480 U
Benzyl alcohol	420 U	410 U	480 U
Diallate	420 U	410 U	480 U
Dibenzofuran	420 U	410 U	480 U
Di-n-butylphthalate	420 U	410 U	480 U
Cresol, m & p	420 U	410 U	480 U
m-Dichlorobenzene	420 U	410 U	480 U
m-Dinitrobenzene	420 U	410 U	480 U
3-Nitroaniline	2,200 U	2,100 U	2,500 U
Cresol (ortho)	420 U	410 U	480 U
o-Dichlorobenzene	420 U	410 U	480 U
2-Nitroaniline	2,200 U	2,100 U	2,500 U
2-Nitrophenol	420 U	410 U	480 U
o-Toluidine	420 U	410 U	480 U
p-Dichlorobenzene	420 U	410 U	480 U
4-Nitroaniline	2,200 U	2,100 U	2,500 U
4-Nitrophenol	2,200 U	2,100 U	2,500 U
1,4-Phenylenediamine	2,200 U	2,100 U	2,500 U
Diesel Range Organics (mg/kg)			
Diesel Range Organics	2.7 J	2.6 J	3.2 J
Gasoline Range Organics	0.3 U	0.27 U	0.27 U

APPENDIX F.40

SUMMARY OF ANALYTICAL RESULTS, SUBSURFACE SOIL - INORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB01	13E-SB02-05	13E-SB03
Sample ID	13E-SB01-04	13E-SB02-05	13E-SB03-05
Sample Date	05/08/04	05/08/04	05/08/04
Sample Depth (ft bgs)	7.00 - 9.00	9.00 - 11.00	9.00 - 11.00
Appendix IX Metals (mg/kg)			
Silver	1.2 U	1.1 U	1.3 U
Arsenic	1.2 U	0.85 B	1.3 U
Barium	250	190	140
Beryllium	0.21 B	0.32 B	0.33 B
Cadmium	3 U	0.56 U	0.67 U
Cobalt	10	23	36
Chromium	10	9	40
Copper	36	18	120
Nickel	4.9	5.4	18
Lead	1.9	0.83	1.9
Antimony	2.4 U	2.2 U	2.7 U
Selenium	1.2 U	1.1 U	1.3 U
Tin	2 B	1.6 B	2.1 B
Thallium	1.2 U	1.1 U	1.3 U
Vanadium	240	210	200
Zinc	52	210	67
Mercury	0.019 B	0.023 U	0.019 B

APPENDIX F.41

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB02	13E-SB03
Sample ID	13E-GW02	13E-GW03
Sample Date	05/10/04	05/10/04
Volatile Organic Compounds (ug/L)		
Chloroform	1 U	1 U
Dichlorodifluoromethane	1 U	1 U
1,1-Dichloroethane	1 U	1 U
1,2-Dichloroethane	1 U	1 U
1,1-Dichloroethene	1 U	1 U
1,2-Dichloropropane	1 U	1 U
Ethyl benzene	1 U	1 U
Acrolein	20 U	20 U
Methylene chloride	5 U	5 U
1,1,2,2-Tetrachloroethane	1 U	1 U
Tetrachloroethene	1 U	1 U
Toluene	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U
2-Butanone	10 U	10 U
Chloroprene	1 U	1 U
2-Hexanone	10 U	10 U
Acrylonitrile	20 U	20 U
3-Chloro-1-propene	1 U	1 U
Benzene	1 U	1 U
Bromoform	1 U	1 U
Carbon tetrachloride	1 U	1 U
Chlorobenzene	1 U	1 U
Acetonitrile	40 U	40 U
1,2-Dibromo-3-chloropropane	1 U	1 U
Dibromomethane	1 U	1 U
trans-1,4-Dichloro-2-butene	2 U	2 U
cis-1,3-Dichloropropene	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U
Ethyl methacrylate	1 U	1 U
Iodomethane	1 U	1 U
Methacrylonitrile	20 U	20 U
Methyl methacrylate	1 U	1 U
Pentachloroethane	5 U	5 U
1,1,1,2-Tetrachloroethane	1 U	1 U
Trichlorofluoromethane	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U
Vinyl chloride	1 U	1 U
Dibromochloromethane	1 U	1 U
Chloroethane	1 U	1 U
Acetone	8 J	7 J

APPENDIX F.41

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB02	13E-SB03
Sample ID	13E-GW02	13E-GW03
Sample Date	05/10/04	05/10/04
Volatile Organic Compounds (ug/L) (Cont.)		
Bromodichloromethane	1 U	1 U
Bromomethane	1 U	1 U
Chloromethane	1 U	1 U
Carbon disulfide	1 U	1.1
1,2-Dibromoethane	1 U	1 U
Propionitrile	20 U	20 U
Isobutanol	40 U	40 U
4-Methyl-2-pentanone	10 U	10 U
Styrene	1 U	1 U
Trichloroethene	1 U	1 U
Vinyl acetate	2 U	2 U
Xylene	2 U	2 U
Semivolatile Organic Compounds (ug/L)		
Phenol	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U
bis(2-Chloroisopropyl)ether	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U
4-Bromophenylphenyl ether	10 U	10 U
Butylbenzylphthalate	10 U	10 U
2-Chloronaphthalene	10 U	10 U
4-Chlorophenyl phenyl ether	10 U	10 U
Chrysene	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U
2-Chlorophenol	10 U	10 U
Acenaphthene	10 U	10 U
3,3'-Dichlorobenzidine	20 U	20 U
Diethylphthalate	10 U	10 U
Dimethyl phthalate	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U
Di-n-octylphthalate	10 U	10 U
2,4-Dichlorophenol	10 U	10 U
Acenaphthylene	10 U	10 U
2-Methylnaphthalene	10 U	10 U
Fluoranthene	10 U	10 U
Fluorene	10 U	10 U
Hexachlorobenzene	10 U	10 U
Hexachlorobutadiene	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U

APPENDIX F.41

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB02	13E-SB03
Sample ID	13E-GW02	13E-GW03
Sample Date	05/10/04	05/10/04
Semivolatile Organic Compounds (ug/L)		
Hexachloroethane	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U
Isophorone	10 U	10 U
Naphthalene	10 U	10 U
2,4-Dimethylphenol	10 U	10 U
Anthracene	10 U	10 U
4,6-Dinitro-2-methylphenol	50 U	50 U
Nitrobenzene	10 U	10 U
N-Nitrosodimethylamine	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U
Phenanthrene	10 U	10 U
Pyrene	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U
4-Nitroquinoline-1-oxide	20 U	20 U
2,4-Dinitrophenol	50 U	50 U
Benzo(a)anthracene	10 U	10 U
Benzo(a)pyrene	10 U	10 U
2,6-Dichlorophenol	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U
4-Aminobiphenyl	10 U	10 U
p-(Dimethylamino)azobenzene	10 U	10 U
7,12-Dimethylbenz(a)anthracene	10 U	10 U
3,3'-Dimethyl benzidine	20 U	20 U
alpha,alpha-Dimethylphenethylamine	2,000 U	2,000 U
1,4-Dioxane	10 U	10 U
n-Nitrosodi-n-propylamine	10 U	10 U
Aniline	20 U	20 U
Ethylmethanesulfonate	10 U	10 U
Acetophenone	10 U	10 U
Aramite	10 U	10 U
Hexachlorophene	5,000 U	5,000 U
Hexachloropropene	10 U	10 U
Isosafrole	10 U	10 U
Methapyrilene	2,000 U	2,000 U
3-Methylcholanthrene	10 U	10 U
Methyl methanesulfonate	10 U	10 U
1,4-Naphthoquinone	10 U	10 U
1-Naphthylamine	10 U	10 U
2-Naphthylamine	10 U	10 U
N-Nitrosodi-n-butylamine	10 U	10 U
N-Nitrosodiethylamine	10 U	10 U
N-Nitrosomethylethylamine	10 U	10 U

APPENDIX F.41

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - ORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB02	13E-SB03
Sample ID	13E-GW02	13E-GW03
Sample Date	05/10/04	05/10/04
Semivolatile Organic Compounds (ug/L)		
N-Nitrosomorpholine	10 U	10 U
N-Nitrosopiperidine	10 U	10 U
N-Nitrosopyrrolidine	10 U	10 U
5-Nitro-o-toluidine	10 U	10 U
Pentachlorobenzene	10 U	10 U
Pentachloronitrobenzene	10 U	10 U
Phenacetin	10 U	10 U
2-Picoline	10 U	10 U
Pronamide	10 U	10 U
Pyridine	50 U	50 U
Safrole	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10 U	10 U
2,3,4,6-Tetrachlorophenol	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U
1,3,5-Trinitrobenzene	10 U	10 U
2-Acetylaminofluorene	10 U	10 U
Dinoseb	10 U	10 U
4-Chloroaniline	20 U	20 U
4-Chloro-3-methylphenol	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U
Pentachlorophenol	50 U	50 U
Benzo(k)fluoranthene	10 U	10 U
Benzyl alcohol	10 U	10 U
Diallate	10 U	10 U
Dibenzofuran	10 U	10 U
Di-n-butylphthalate	10 U	10 U
Cresol, m & p	10 U	10 U
m-Dichlorobenzene	10 U	10 U
m-Dinitrobenzene	10 U	10 U
3-Nitroaniline	50 U	50 U
Cresol (ortho)	10 U	10 U
o-Dichlorobenzene	10 U	10 U
2-Nitroaniline	50 U	50 U
2-Nitrophenol	10 U	10 U
o-Toluidine	10 U	10 U
p-Dichlorobenzene	10 U	10 U
4-Nitroaniline	50 U	50 U
4-Nitrophenol	50 U	50 U
1,4-Phenylenediamine	2,000 U	2,000 U
Total Petroleum Hydrocarbons (mg/L)		
Diesel Range Organics	0.81	0.71
Gasoline Range Organics	0.014 J	0.05 U

APPENDIX F.42

SUMMARY OF ANALYTICAL RESULTS, GROUNDWATER - INORGANICS
ECP SITE 13 - FORMER GAS STATION
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Site ID	13E-SB02	13E-SB03
Sample ID	13E-GW02	13E-GW03
Sample Date	05/10/04	05/10/04
Appendix IX (Dissolved) Metals (mg/L)		
Silver	0.005 U	0.005 U
Arsenic	0.01 U	0.01 U
Barium	0.0061 B	0.043
Beryllium	0.004 U	0.004 U
Cadmium	0.005 U	0.005 U
Cobalt	0.01 U	0.0014 B
Chromium	0.01 U	0.01 U
Copper	0.02 U	0.0032 B
Nickel	0.0023 B	0.004 B
Lead	0.005 U	0.005 U
Antimony	0.02 U	0.02 U
Selenium	0.01 U	0.01 U
Tin	0.05 U	0.05 U
Thallium	0.01 U	0.01 U
Vanadium	0.067	0.038
Zinc	0.0033 B	0.0058 B
Mercury	0.0012 B	0.004 U
Total Cyanide and Sulfide (mg/L)		
Sulfide	1 U	1 U
Cyanide	0.01 U	0.01 U

LIST OF APPENDICES

A Final Phase II ECP Work Plan

B Phase II ECP Field Investigation Photographs

C Soil Boring and Well Construction Details

- C.1 ECP Site 3
- C.2 ECP Site 5
- C.3 ECP Site 6
- C.4 ECP Site 7
- C.5 ECP Site 8
- C.6 ECP Site 11
- C.7 ECP Site 12
- C.8 ECP Site 13
- C.9 ECP Site 14
- C.10 ECP Site 15
- C.11 ECP Site 16
- C.12 ECP Site 17
- C.13 ECP Site 18
- C.14 ECP Site 19
- C.15 ECP Site 20

D Chain-of-Custody Records

E Phase II Field Investigation Notes

- E.1 Field notes from Mark DeJohn – Geologist
- E.2 Field notes from Jon Edel – Site Manager
- E.3 Field notes from Pete Monday – Environmental Scientist
- E.4 Field notes from Emily Bond – Environmental Scientist

F Summary of Analytical Results

- F.1 Site 2, Surface Water – Organics
- F.2 Site 2, Surface Water – Inorganics
- F.3 Site 2, Sediment – Organics
- F.4 Site 2, Sediment – Inorganics
- F.5 Site 3, Surface Soil – Organics
- F.6 Site 3, Surface Soil – Inorganics
- F.7 Site 3, Subsurface Soil – Organics
- F.8 Site 3, Subsurface Soil – Inorganics
- F.9 Site 3, Groundwater – Organics
- F.10 Site 3, Groundwater – Inorganics
- F.11 Site 5, Surface Soil – Organics
- F.12 Site 5, Surface Soil – Inorganics
- F.13 Site 5, Subsurface Soil – Organics
- F.14 Site 5, Subsurface Soil – Inorganics
- F.15 Site 5, Groundwater – Organics
- F.16 Site 5, Groundwater – Inorganics
- F.17 Site 6, Surface Soil – Organics
- F.18 Site 6, Surface Soil – Inorganics

LIST OF APPENDICES
(continued)

F Summary of Analytical Results (continued)

F.19 Site 6, Subsurface Soil – Organics
F.20 Site 6, Subsurface Soil – Inorganics
F.21 Site 6, Groundwater – Organics
F.22 Site 6, Groundwater – Inorganics
F.23 Site 6, Sediment – Organics
F.24 Site 6, Sediment – Inorganics
F.25 Site 6, Surface Water – Organics
F.26 Site 6, Surface Water – Inorganics
F.27 Site 7, Surface Soil – Organics
F.28 Site 7, Surface Soil – Inorganics
F.29 Site 7, Subsurface Soil – Organics
F.30 Site 7, Subsurface Soil – Inorganics
F.31 Site 8, Surface Soil – Organics
F.32 Site 8, Surface Soil – Inorganics
F.33 Site 8, Subsurface Soil – Organics
F.34 Site 8, Subsurface Soil – Inorganics
F.35 Site 11, Subsurface Soil – Organics
F.36 Site 11, Subsurface Soil – Inorganics
F.37 Site 12, Subsurface Soil – Organics
F.38 Site 12, Subsurface Soil – Inorganics
F.39 Site 13, Subsurface Soil – Organics
F.40 Site 13, Subsurface Soil – Inorganics
F.41 Site 13, Groundwater – Organics
F.42 Site 13, Groundwater – Inorganics
F.43 Site 14, Surface Soil – Organics
F.44 Site 14, Surface Soil – Inorganics
F.45 Site 14, Subsurface Soil – Organics
F.46 Site 14, Subsurface Soil – Inorganics
F.47 Site 15, Surface Soil – Organics
F.48 Site 15, Surface Soil – Inorganics
F.49 Site 15, Subsurface Soil – Organics
F.50 Site 15, Subsurface Soil – Inorganics
F.51 Site 16, Surface Soil – Organics
F.52 Site 16, Surface Soil – Inorganics
F.53 Site 16, Subsurface Soil – Organics
F.54 Site 16, Subsurface Soil – Inorganics
F.55 Site 16, Groundwater – Organics
F.56 Site 16, Groundwater – Inorganics
F.57 Site 16, Sediment – Organics
F.58 Site 16, Sediment – Inorganics
F.59 Site 16, Surface Water – Organics
F.60 Site 16, Surface Water – Inorganics
F.61 Site 17, Surface Soil – Organics
F.62 Site 17, Surface Soil – Inorganics
F.63 Site 17, Subsurface Soil – Organics
F.64 Site 17, Subsurface Soil – Inorganics
F.65 Site 17, Groundwater – Organics

LIST OF APPENDICES
(continued)

F Summary of Analytical Results (continued)

F.66 Site 17, Groundwater – Inorganics
F.67 Site 18, Subsurface Soil – Organics
F.68 Site 18, Subsurface Soil – Inorganics
F.69 Site 18, Groundwater – Organics
F.70 Site 18, Groundwater – Inorganics
F.71 Site 19, Surface Soil – Organics
F.72 Site 19, Surface Soil – Inorganics
F.73 Site 19, Subsurface Soil – Organics
F.74 Site 19, Subsurface Soil – Inorganics
F.75 Site 19, Groundwater – Organics
F.76 Site 19, Groundwater – Inorganics
F.77 Site 20, Subsurface Soil – Organics
F.78 Site 20, Subsurface Soil – Inorganics
F.79 Site 20, Groundwater – Organics
F.80 Site 20, Groundwater – Inorganics
F.81 Site 21, Wipe Samples – Organics
F.82 Site 21, Wipe Samples - Inorganics

G QA/QC Analytical Results

G.1 Trip Blank Samples – Organics
G.2 QA/QC Samples – Organics
G.3 QA/QC Samples – Total Inorganics
G.4 IDW Sample

H Laboratory Case Narratives and Puerto Rican Chemist Certification Pages

APPENDIX G
QA/QC Analytical Results

Data Qualifiers:

U – Not Detected.
J – Estimated value.
UJ – Report quantitation limit is qualified as estimated.
R – Result is rejected and unusable.
X – Surrogate recovery was outside of advisory limits.
* - Duplicate analysis is not within control limits.
NA – Not Analyzed.

Notes:

mg/kg – milligrams per kilogram.
µg/kg – micrograms per kilogram.
µg/L – micrograms per liter.
mg/L – milligrams per liter.

APPENDIX G.1
Trip Blank Samples - Organics

APPENDIX G.1

SUMMARY OF ANALYTICAL RESULTS, TRIP BLANK SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-TB01	E-TB02	E-TB03	E-TB04	E-TB05	E-TB06	E-TB07
Sample Date	05/06/04	05/06/04	05/10/04	05/12/04	05/14/04	05/14/04	05/17/04
Volatile Organic Compounds (ug/L)							
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acrolein	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroprene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U
3-Chloro-1-propene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetonitrile	40 U	40 U	40 U	40 U	40 U	40 U	40 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	2 U	2 U	2 U	2 U	2 U	2 U	2 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl methacrylate	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iodomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methacrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Methyl methacrylate	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Pentachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX G.1

SUMMARY OF ANALYTICAL RESULTS, TRIP BLANK SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-TB01	E-TB02	E-TB03	E-TB04	E-TB05	E-TB06	E-TB07
Sample Date	05/06/04	05/06/04	05/10/04	05/12/04	05/14/04	05/14/04	05/17/04
Volatile Organic Compounds (ug/L) (Cont.)							
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Propionitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Isobutanol	40 U	40 U	40 U	40 U	40 U	40 U	40 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl acetate	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylene	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Total Petroleum Hydrocarbons (mg/L)							
Gasoline Range Organics	NA	NA	NA	0.05 U	NA	0.05 U	0.05 U

APPENDIX G.2
QA/QC Samples - Organics

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Volatile Organic Compounds (ug/L)									
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.91 J	78
Dichlorodifluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acrolein	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Methylene chloride	5 U	5 U	1.7 J	5 U	5 U	5 U	5 U	5 U	2.8 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	4.9 J
Chloroprene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
3-Chloro-1-propene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	0.54 J	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetonitrile	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Volatile Organic Compounds (ug/L) (Cont.)									
Ethyl methacrylate	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iodomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methacrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Methyl methacrylate	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Pentachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1,2-Tetrachloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.9
Chloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.34 J	9.6
Bromomethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Propionitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Isobutanol	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
4-Methyl-2-pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl acetate	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Semivolatile Organic Compounds (ug/L)									
Phenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenylphenyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl phenyl ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Semivolatile Organic Compounds (ug/L) (Cont.)									
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodimethylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroquinoline-1-oxide	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Aminobiphenyl	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
p-(Dimethylamino)azobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
7,12-Dimethylbenz(a)anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dimethyl benzidine	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
alpha,alpha-Dimethylphenethylamine	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
1,4-Dioxane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
n-Nitrosodi-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aniline	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Ethylmethanesulfonate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetophenone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aramite	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorophene	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
Hexachloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Semivolatile Organic Compounds (ug/L) (Cont.)									
Isosafrole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methapyrilene	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
3-Methylcholanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl methanesulfonate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Naphthoquinone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1-Naphthylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Naphthylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodi-n-butylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiethylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosomethylethylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosomorpholine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosopiperidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitrosopyrrolidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
5-Nitro-o-toluidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachloronitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenacetin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Picoline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pronamide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyridine	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Safrole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,3,4,6-Tetrachlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3,5-Trinitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Acetylaminofluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dinoseb	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Semivolatile Organic Compounds (ug/L) (Cont.)									
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Benzo(k)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzyl alcohol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diallate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Cresol, m & p	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
m-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
m-Dinitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Cresol (ortho)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
o-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
o-Toluidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
p-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,4-Phenylenediamine	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
Pesticides/PCBs (ug/L)									
Dieldrin	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toxaphene	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Pesticides/PCBs (ug/L) (Cont.)									
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlordane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Endosulfan II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Kepone	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzilate	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Isodrin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methoxychlor	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Aroclor-1242	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1254	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1221	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Aroclor-1232	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1248	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1260	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1016	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

APPENDIX G.2

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - ORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
OP-Pesticides (ug/L)									
Thionazin	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Famphur	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethoate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Disulfoton	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Parathion (Ethyl parathion)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methyl parathion	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
O,O,O-Triethyl phosphorothioate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phorate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sulfotepp	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorinated Herbicides (ug/L)									
2,4,5-TP	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-D	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4,5-T	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Petroleum Hydrocarbons (mg/L)									
Diesel Range Organics	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.055 J	0.1 U
Gasoline Range Organics	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

APPENDIX G.3
QA/QC Samples – Total Inorganics

APPENDIX G.3

SUMMARY OF ANALYTICAL RESULTS, QA/QC SAMPLES - (TOTAL) INORGANICS
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-ER01	E-ER02	E-ER03	E-ER04	E-ER05	E-ER06	E-FB01	E-FB02	E-FB03
Sample Date	05/10/04	05/10/04	05/09/04	05/15/04	05/13/04	05/13/04	05/14/04	05/15/04	05/16/04
Appendix IX (Total) Inorganics (mg/L)									
Silver	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.01 U	0.0026 B	0.01 U	0.01 U
Arsenic	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Barium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0044 B
Beryllium	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cobalt	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0029 B	0.01 U	0.01 U
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0029 B	0.01 U	0.01 U
Copper	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.0032 B	0.02 U	0.02 U
Nickel	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Lead	0.005 U	0.005 U	0.0036 B	0.005 U	0.0036 B	0.005 U	0.005 U	0.005 U	0.005 U
Antimony	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.0063 B	0.02 U	0.02 U
Selenium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Tin	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0076 B	0.05 U	0.05 U
Thallium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Vanadium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0033 B	0.01 U	0.0007 B
Zinc	0.02 B	0.036	0.024	0.0022 B	0.024	0.025	0.0059 B	0.022	0.022
Mercury	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Sulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyanide	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

APPENDIX G.4
IDW Sample

APPENDIX G.4

SUMMARY OF ANALYTICAL RESULTS, IDW SAMPLE
PHASE II ECP REPORT
NAVAL ACTIVITY PUERTO RICO, CEIBA, PUERTO RICO

Sample ID	E-IDW01	
Sample Date	05/16/04	
Benzene (ug/L)		
Benzene	5	U*XX
RCRA Metals (mg/L)		
Silver	0.01	U
Arsenic	0.056	
Barium	0.83	
Cadmium	0.014	
Chromium	1.2	
Mercury	0.00038	
Lead	0.27	E
Selenium	0.0091	B

CH2MHILL
CTO JM08 NAPR SWMU 67
SH4986

KATAHDIN ANALYTICAL SERVICES, INC.
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

TABLE OF CONTENTS

Total number of pages: 334

SAMPLE DATA PACKAGE		0000001		
Narrative	----------	0000002	to	0000005
Supporting Documents	----------	0000006	to	0000006
Chain of Custody Record	----------	0000007	to	0000007
Login Report	----------	0000008	to	0000009
SAMPLE DATA SUMMARY				
Report of Analytical Results	----------	A0000001	to	A0000069
METALS DATA		4000001		
Sample Data	----------	4000002	to	4000013
QC Summary	----------	4000014	to	4000060
Raw Data	----------	4000061	to	4000234
Logbooks and Supporting Documents	----------	4000235	to	4000237
CONVENTIONAL AND PHYSICAL ANALYTICAL DATA		5000001		
QC Summary	----------	5000002	to	5000005
Sample Data	----------	5000006	to	5000015
Raw Data	----------	5000016	to	5000019

SAMPLE DATA PACKAGE

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
CH2MHILL
CTO JM08 NAPR SWMU 67
SH4986

Sample Receipt

The following samples were received on July 08, 2014 and were logged in under Katahdin Analytical Services work order number SH4986 for a hardcopy due date of August 01, 2014.

KATAHDIN Sample No.	CH2MHILL Sample Identification
SH4986-1	NAPR-W67-SB09R-0507
SH4986-2	NAPR-W67-SB09RP-0507
SH4986-3	NAPR-W67-SB10-0507
SH4986-4	NAPR-W67-SB11-0507
SH4986-5	NAPR-W67-SB12-0507
SH4986-6	NAPR-W67-SB12-0709
SH4986-7	NAPR-W67-SB13-0507
SH4986-8	NAPR-W67-SB14-0507
SH4986-9	NAPR-W67-EB01-070314

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Jennifer Obrin**. This narrative is an integral part of the Report of Analysis.

Some of the client IDs on the Chain of Custody exceeds the 19-character limit of the Katahdin Analytical Information Management System. Therefore, the first character "N" in the client ID for samples SH4986-2 and 9 were omitted on all forms.

Metals Analysis

The samples of Katahdin Work Order SH4986 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods" SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Aqueous-matrix Katahdin Sample Number SH4986 –9 was digested for ICP-MS analysis on 06/09/14 (QC Batch HG09IMW2) in accordance with USEPA Method 3010A. Katahdin Sample Number SH4986 -9 was prepared with duplicate matrix-spiked aliquots.

Solid-matrix Katahdin Sample Numbers SH4986 –(1-8) were digested for ICP-MS analysis on 06/15/14 (QC Batch HG15IMS1) in accordance with USEPA Method 3010A. Katahdin Sample Number SH4986 - 8 was prepared with duplicate matrix-spiked aliquots.

ICP-MS analyses of Katahdin Work Order SH4986 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020A. Results for all standards and samples are reported using the mean of 3 replicate measurements. All sample digestates were diluted by a factor of 5 during analysis to reduce mass interferences from chlorine, which is present in the digestates from the hydrochloric acid used in digesting the samples. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	**Associated Analytes**
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium
Bismuth	Lead, Thallium

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of cobalt in the matrix-spiked aliquots of Katahdin Sample Numbers SH4986 –(8 and 9) are within the project acceptance criteria (80% - 120% recovery of the added element, if the native concentration is less than four times the amount added).

The matrix-spike duplicate analysis of Katahdin Sample Numbers SH4986 –(8 and 9) are within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for cobalt.

The serial dilution analysis of Katahdin Sample Numbers SH4986 –(8 and 9) are within the project acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the LOQ) for cobalt.

The measured recovery of cobalt in the post-digestion spike of Katahdin Sample Number SH4986 –8 is outside the acceptance criteria (75% - 125% recovery of the added element). For cobalt this may be attributed to the native concentration in the sample being significantly higher than the spike amount added.

The measured recovery of cobalt in the post-digestion spike of Katahdin Sample Number SH4986 –9 is within the acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added).

Reporting of Metals Results

Per client request, analytical results for client samples on Form I and preparation blanks on Form IIIP have been reported using the laboratory's limits of detection (LOD). All results were evaluated down to the laboratory's method detection limits (MDLs). Results that fall between the MDL and the LOQ are flagged with "J" in the C-qualifier column, and the measured concentration appears in the concentration column. Results that are less than the MDL are flagged with "U" in the C-qualifier column, and the LOD is listed in the concentration column. These LOQs, MDLs, and LODs have been adjusted for each sample based on the sample amounts used in preparation and analysis.

Analytical results on Forms VA, VD, VII, and IX for client samples, matrix QC samples (duplicates and matrix spikes), and laboratory control samples have been reported down to the laboratory's method detection limits (MDLs). Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column, and the measured concentration is listed in the concentration column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, LODs, MDLs, and LOQs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of Work Order SH4986 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Standard Methods for the Examination of Water and Wastewater", 15th, 16th, 17th, 18th, 19th, and 20th editions, 1980, 1985, 1989, 1992, 1995, 1999. APHA-AWWA-WPCF.

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
073114

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc. **Sample Receipt Condition Report**

Client: CH2MHill	KAS PM: JO	Sampled By: Client
Project:	KIMS Entry By: GN	Delivered By: Fed-Ex
KAS Work Order#: 5H4986	KIMS Review By: JD	Received By: GN
SDG #: Cooler: 1 of 1		Date/Time Rec.: 7-8-14/09:10

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 5.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?		✓		✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page ____ of ____

Client	Contact	Phone #	Fax #
CHEM HILL	MIKE ZAMBONI	(703) 376 5301	( )

Address | City | State | Zip Code

Purchase Order # | Proj. Name / No. SUMU 67 / 492993.71. FI.FK | Katahdin Quote #

Bill (if different than above) | Address

Sampler (Print / Sign) RONNY FIELDS / [signature] | Copies To:

LAB USE ONLY WORK ORDER #: 5H4986

KATAHDIN PROJECT NUMBER ____

REMARKS: ____

SHIPPING INFO: ❒ FED EX ❒ UPS ❒ CLIENT

AIRBILL NO: ____

TEMP°C ____ ❒ TEMP BLANK ❒ INTACT ❒ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	SW-846 6020A (COBALT ONLY)	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N	Filt. ❒Y ❒N
	NAPR-W67-SB09R-0507	7/3/14 / 0845	SOIL	1	X										
	NAPR-W67-SB09RP-0507	7/3/14 / 0850	SOIL	1	X										
	NAPR-W67-SB10-0507	7/3/14 / 0855	SOIL	1	X										
	NAPR-W67-SB11-0507	7/3/14 / 0905	SOIL	1	X										
	NAPR-W67-SB12-0507	7/3/14 / 0915	SOIL	1	X										
	NAPR-W67-SB12-0709	7/3/14 / 0920	SOIL	1	X										
	NAPR-W67-SB13-0507	7/3/14 / 0930	SOIL	1	X										
	NAPR-W67-SB14-0507	7/3/14 / 0940	SOIL	1	X										
	NAPR-W67-SB14-0507MS	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE)									
	NAPR-W67-SB14-0507SD	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE DUPLICATE)									
	NAPR-W67-EB01-070314	7/3/14 / 1000	QC	1	X	(EQUIPMENT BLANK)									
		/													
		/													
		/													
		/													
		/													

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	7/7/14 0905				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

ORIGINAL

KAS-COC1

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 08, 2014
11:04 AM

Login Number: SH4986

Account: CH2MVA001 Web
CH2MHill

Project: CH2MNAPR-CTO-JM08
CTO JM08 NAPR SWMU 67

Quote/Incoming: CH2MNAPR-CTO-JM

Primary Report Address:
Michael Zamboni
CH2MHill
15010 Conference Center Drive
Suite 200
Chantilly,VA 20151
michael.zamboni@ch2m.com

Primary Invoice Address:
Accounts Payable
CH2M Hill, Inc.
PO Box 241329

Denver,CO 80224

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	DoD QSM V4.2 with DoD limits. ND to LOD. "J" flag between MDL and LOQ. SW6020A. Client charge is for PR chemist certification.
CHECK NO.	:	
CLIENT PO#	:	No PO required; 475153.67.PP.FR
CLIENT PROJECT MANAGE	:	Linda Saksvig
CONTRACT	:	N62470-11-D-8012
COOLER TEMPERATURE	:	5.9
DELIVERY SERVICES	:	Fedex
EDD FORMAT	:	KAS106QC-XLS
LOGIN INITIALS	:	GN
PM	:	JO
PROJECT NAME	:	CTO JM08 NAPR SWMU 67
QC LEVEL	:	IV
REGULATORY LIST	:	
REPORT INSTRUCTIONS	:	Data summary needs all forms. Send HC, CD and invoice copy to Mike. Email PDF to PR Chemist Maritza Vazquez (chembio@maritzavazquez.com) for certification.
SDG ID	:	
SDG STATUS	:	

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH4986-1	NAPR-W67-SB09R-0507	03-JUL-14 08:45	08-JUL-14			01-AUG-14	
SH4986-2	APR-W67-SB09RP-0507	03-JUL-14 08:50	08-JUL-14			01-AUG-14	
SH4986-3	NAPR-W67-SB10-0507	03-JUL-14 08:55	08-JUL-14			01-AUG-14	
SH4986-4	NAPR-W67-SB11-0507	03-JUL-14 09:05	08-JUL-14			01-AUG-14	
SH4986-5	NAPR-W67-SB12-0507	03-JUL-14 09:15	08-JUL-14			01-AUG-14	
SH4986-6	NAPR-W67-SB12-0709	03-JUL-14 09:20	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Service	S	CLIENT-CHARGE				
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			
Solid	S	SW3050MS-PREP	30-DEC-14			NAPR-W67-SB09RP-0507
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

07.08.14

0000008

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 08, 2014
11:04 AM

Login Number: SH4986

Quote/Incoming: CH2MNAPR-CTO-JM

Account: CH2MVA001 Web
CH2MHill

Project: CH2MNAPR-CTO-JM08
CTO JM08 NAPR SWMU 67

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH4986-7	NAPR-W67-SB13-0507	03-JUL-14 09:30	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-8	NAPR-W67-SB14-0507	03-JUL-14 09:40	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			**MS/MSD**
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-9	APR-W67-EB01-070314	03-JUL-14 10:00	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SW3010MS-PREP	30-DEC-14	250mL Plastic+HNO3		**NAPR-W67-EB01-070314**
Aqueous	S	SW6020-COBALT	30-DEC-14	250mL Plastic+HNO3		

Total Samples: **9** ***Total Analyses:*** **27**

07.08.14

0000009

SAMPLE DATA SUMMARY PACKAGE

METALS SAMPLE FLAGGING

FLAG	SPECIFIED MEANING
E	The reported value is estimated because of the presence of interference (as indicated by serial dilution).
N	The pre-digestion spiked sample recovery is not within control limits.
*	The duplicate sample analysis relative percent difference (RPD) is not within control limits.
B	Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.
A	The post-digestion spiked sample recovery is not within control limits.
•	Analytical run QC sample (e.g. ICV, CCV, ICB, CCB, ICSA, ICSAB) not within control limits.
U	The analyte was not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client. Note: All results reported as “U” MDL have a 50% rate for false negatives compared to those results reported as “U” PQL/LOQ or “U” LOD, where the rate of false negatives is <1%.
J	The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ) (previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS
(Refer to BOD Qualifiers Page for BOD footnotes)

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1	pH	H2	DO
H3	sulfite	H4	residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB09R-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.9 **Lab Sample ID:** SH4986-001

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	24.8			MS	5	0.072	0.0039	0.022

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-SB09RP-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-002

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	25.9			MS	5	0.069	0.0038	0.021

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB10-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.6 **Lab Sample ID:** SH4986-003

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	18.8			MS	5	0.066	0.0036	0.020

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB11-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 86.6 **Lab Sample ID:** SH4986-004

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	26.1			MS	5	0.082	0.0045	0.025

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-005

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	36.2			MS	5	0.072	0.0039	0.021

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0709

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 77.4 **Lab Sample ID:** SH4986-006

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	29.3			MS	5	0.076	0.0042	0.023

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB13-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 87.3 **Lab Sample ID:** SH4986-007

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	36.5			MS	5	0.064	0.0035	0.019

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	25.5		A	MS	5	0.062	0.0034	0.019

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	0.30	U		MS	5	1.0	0.060	0.30

Comments:

FORM I - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICV

File: JHG23A Jul 23, 2014 12:44

Analyte	True	Found	%R (1)
ALUMINUM	400.0	398.70	99.7
CALCIUM	4000.0	4072.00	101.8
COBALT	20.0	20.11	100.6
IRON	4000.0	4053.00	101.3
MAGNESIUM	4000.0	4056.00	101.4
MOLYBDENUM	40.0	41.06	102.6
POTASSIUM	4000.0	4003.00	100.1
SODIUM	4000.0	3991.00	99.8

SAMPLE: CCV

File: JHG23A Jul 23, 2014 13:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	489.70	97.9
CALCIUM	5000.0	5001.00	100.0
COBALT	25.0	24.17	96.7
IRON	5000.0	4952.00	99.0
MAGNESIUM	5000.0	4871.00	97.4
MOLYBDENUM	25.0	25.07	100.3
POTASSIUM	5000.0	4862.00	97.2
SODIUM	5000.0	4855.00	97.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 13:43

Analyte	True	Found	%R (1)
ALUMINUM	500.0	489.30	97.9
CALCIUM	5000.0	4881.00	97.6
COBALT	25.0	23.75	95.0
IRON	5000.0	4837.00	96.7
MAGNESIUM	5000.0	4852.00	97.0
MOLYBDENUM	25.0	24.25	97.0
POTASSIUM	5000.0	4808.00	96.2
SODIUM	5000.0	4827.00	96.5

SAMPLE: CCV

File: JHG23A Jul 23, 2014 14:23

Analyte	True	Found	%R (1)
ALUMINUM	500.0	515.60	103.1
CALCIUM	5000.0	4943.00	98.9
COBALT	25.0	24.15	96.6
IRON	5000.0	4938.00	98.8
MAGNESIUM	5000.0	4950.00	99.0
MOLYBDENUM	25.0	24.72	98.9
POTASSIUM	5000.0	4894.00	97.9
SODIUM	5000.0	4914.00	98.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 15:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	498.60	99.7
CALCIUM	5000.0	5033.00	100.7
COBALT	25.0	24.53	98.1
IRON	5000.0	4978.00	99.6
MAGNESIUM	5000.0	4942.00	98.8
MOLYBDENUM	25.0	25.11	100.4
POTASSIUM	5000.0	4907.00	98.1
SODIUM	5000.0	4905.00	98.1

SAMPLE: CCV

File: JHG23A Jul 23, 2014 15:46

Analyte	True	Found	%R (1)
ALUMINUM	500.0	502.00	100.4
CALCIUM	5000.0	4997.00	99.9
COBALT	25.0	24.06	96.2
IRON	5000.0	4917.00	98.3
MAGNESIUM	5000.0	4914.00	98.3
MOLYBDENUM	25.0	25.04	100.2
POTASSIUM	5000.0	4867.00	97.3
SODIUM	5000.0	4873.00	97.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 16:28

Analyte	True	Found	%R (1)
ALUMINUM	500.0	509.90	102.0
CALCIUM	5000.0	5064.00	101.3
COBALT	25.0	24.56	98.2
IRON	5000.0	4990.00	99.8
MAGNESIUM	5000.0	4901.00	98.0
MOLYBDENUM	25.0	24.98	99.9
POTASSIUM	5000.0	4936.00	98.7
SODIUM	5000.0	4832.00	96.6

SAMPLE: CCV

File: JHG23A Jul 23, 2014 17:10

Analyte	True	Found	%R (1)
ALUMINUM	500.0	488.80	97.8
CALCIUM	5000.0	4959.00	99.2
COBALT	25.0	24.29	97.2
IRON	5000.0	4974.00	99.5
MAGNESIUM	5000.0	4826.00	96.5
MOLYBDENUM	25.0	24.61	98.4
POTASSIUM	5000.0	4827.00	96.5
SODIUM	5000.0	4771.00	95.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 17:52

Analyte	True	Found	%R (1)
ALUMINUM	500.0	520.90	104.2
CALCIUM	5000.0	5039.00	100.8
COBALT	25.0	24.54	98.2
IRON	5000.0	5075.00	101.5
MAGNESIUM	5000.0	5057.00	101.1
MOLYBDENUM	25.0	25.55	102.2
POTASSIUM	5000.0	4963.00	99.3
SODIUM	5000.0	4986.00	99.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICV

File: JHG28A Jul 28, 2014 12:49

Analyte	True	Found	%R (1)
ALUMINUM	400.0	400.30	100.1
CALCIUM	4000.0	3890.00	97.3
COBALT	20.0	20.27	101.4
IRON	4000.0	3944.00	98.6
MAGNESIUM	4000.0	4086.00	102.2
MOLYBDENUM	40.0	41.33	103.3
POTASSIUM	4000.0	3977.00	99.4
SODIUM	4000.0	3950.00	98.8

SAMPLE: CCV

File: JHG28A Jul 28, 2014 13:09

Analyte	True	Found	%R (1)
ALUMINUM	500.0	493.20	98.6
CALCIUM	5000.0	4846.00	96.9
COBALT	25.0	24.41	97.6
IRON	5000.0	4764.00	95.3
MAGNESIUM	5000.0	4956.00	99.1
MOLYBDENUM	25.0	25.28	101.1
POTASSIUM	5000.0	4872.00	97.4
SODIUM	5000.0	4886.00	97.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG28A Jul 28, 2014 13:25

Analyte	True	Found	%R (1)
ALUMINUM	500.0	491.10	98.2
CALCIUM	5000.0	4830.00	96.6
COBALT	25.0	24.47	97.9
IRON	5000.0	4784.00	95.7
MAGNESIUM	5000.0	4953.00	99.1
MOLYBDENUM	25.0	24.88	99.5
POTASSIUM	5000.0	4853.00	97.1
SODIUM	5000.0	4869.00	97.4

SAMPLE: CCV

File: JHG28A Jul 28, 2014 14:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	495.70	99.1
CALCIUM	5000.0	4874.00	97.5
COBALT	25.0	24.44	97.8
IRON	5000.0	4798.00	96.0
MAGNESIUM	5000.0	4938.00	98.8
MOLYBDENUM	25.0	24.92	99.7
POTASSIUM	5000.0	4909.00	98.2
SODIUM	5000.0	4876.00	97.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG28A Jul 28, 2014 14:45

Analyte	True	Found	%R (1)
ALUMINUM	500.0	504.50	100.9
CALCIUM	5000.0	4853.00	97.1
COBALT	25.0	24.58	98.3
IRON	5000.0	4851.00	97.0
MAGNESIUM	5000.0	4992.00	99.8
MOLYBDENUM	25.0	24.99	100.0
POTASSIUM	5000.0	4947.00	98.9
SODIUM	5000.0	5146.00	102.9

SAMPLE: CCV

File: JHG28A Jul 28, 2014 15:27

Analyte	True	Found	%R (1)
ALUMINUM	500.0	516.30	103.3
CALCIUM	5000.0	4867.00	97.3
COBALT	25.0	24.47	97.9
IRON	5000.0	4816.00	96.3
MAGNESIUM	5000.0	5083.00	101.7
MOLYBDENUM	25.0	25.19	100.8
POTASSIUM	5000.0	4952.00	99.0
SODIUM	5000.0	5015.00	100.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: PQL

File: JHG23A Jul 23, 2014 12:50

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.53	100.9
CALCIUM	20.0	18.80	94.0
COBALT	0.2	0.19	95.0
IRON	20.0	25.99	129.9•
MAGNESIUM	20.0	20.27	101.4
MOLYBDENUM	1.0	1.00	100.0
POTASSIUM	200.0	204.10	102.1
SODIUM	200.0	209.90	105.0

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: PQL

File: JHG28A Jul 28, 2014 12:56

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	61.57	102.6
CALCIUM	20.0	24.09	120.4
COBALT	0.2	0.22	110.0
IRON	20.0	22.40	112.0
MAGNESIUM	20.0	20.68	103.4
MOLYBDENUM	1.0	1.04	104.0
POTASSIUM	200.0	204.00	102.0
SODIUM	200.0	212.10	106.1

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICB

File: JHG23A Jul 23, 2014 12:47

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	-0.011	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.133	J
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 13:07

Analyte	Result	C
ALUMINUM	0.506	J
CALCIUM	4.100	U
COBALT	-0.017	U
IRON	-12.790	U
MAGNESIUM	2.128	J
MOLYBDENUM	0.331	J
POTASSIUM	8.200	U
SODIUM	5.730	J

SAMPLE: CCB

File: JHG23A Jul 23, 2014 13:46

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	-10.520	U
COBALT	-0.016	U
IRON	-8.950	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG23A Jul 23, 2014 14:26

Analyte	Result	C
ALUMINUM	3.791	J
CALCIUM	-8.912	U
COBALT	-0.017	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 15:07

Analyte	Result	C
ALUMINUM	2.117	J
CALCIUM	-9.665	U
COBALT	-0.014	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 15:49

Analyte	Result	C
ALUMINUM	7.949	J
CALCIUM	-8.561	U
COBALT	-0.009	U
IRON	7.312	J
MAGNESIUM	1.487	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	4.612	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG23A Jul 23, 2014 16:31

Analyte	Result	C
ALUMINUM	6.000	J
CALCIUM	-9.481	U
COBALT	-0.019	U
IRON	4.700	U
MAGNESIUM	0.751	J
MOLYBDENUM	0.120	U
POTASSIUM	-14.010	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 17:13

Analyte	Result	C
ALUMINUM	1.719	J
CALCIUM	-9.237	U
COBALT	-0.010	U
IRON	4.700	U
MAGNESIUM	0.913	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 17:55

Analyte	Result	C
ALUMINUM	5.211	J
CALCIUM	-13.680	U
COBALT	-0.012	U
IRON	14.910	B
MAGNESIUM	1.865	J
MOLYBDENUM	0.120	U
POTASSIUM	12.140	J
SODIUM	3.900	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICB

File: JHG28A Jul 28, 2014 12:53

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	-4.203	U
COBALT	0.006	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.146	J
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG28A Jul 28, 2014 13:12

Analyte	Result	C
ALUMINUM	0.679	J
CALCIUM	4.100	U
COBALT	-0.015	U
IRON	-15.940	U
MAGNESIUM	1.941	J
MOLYBDENUM	0.423	B
POTASSIUM	-14.290	U
SODIUM	6.722	J

SAMPLE: CCB

File: JHG28A Jul 28, 2014 13:29

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	-0.012	U
IRON	-17.950	U
MAGNESIUM	0.726	J
MOLYBDENUM	0.153	J
POTASSIUM	-13.190	U
SODIUM	4.432	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG28A Jul 28, 2014 14:08

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	0.006	U
IRON	-8.611	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	-10.750	U
SODIUM	6.179	J

SAMPLE: CCB

File: JHG28A Jul 28, 2014 14:48

Analyte	Result	C
ALUMINUM	0.545	J
CALCIUM	-5.803	U
COBALT	0.006	U
IRON	-6.456	U
MAGNESIUM	1.654	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	214.900	B

SAMPLE: CCB

File: JHG28A Jul 28, 2014 15:30

Analyte	Result	C
ALUMINUM	0.646	J
CALCIUM	-12.650	U
COBALT	-0.008	U
IRON	-8.747	U
MAGNESIUM	0.871	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	31.690	J

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSHG15IMS1

Matrix: SOIL **SDG Name:** SH4986

QC Batch ID: HG15IMS1

Concentration Units : mg/Kg drywt

Analyte	RESULT	C
COBALT	0.030	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBWHG09IMW2

Matrix: WATER **SDG Name:** SH4986

QC Batch ID: HG09IMW2

Concentration Units : ug/L

Analyte	RESULT	C
COBALT	0.30	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICSA

File: JHG23A Jul 23, 2014 12:53

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92720	92.7
CALCIUM	100000	92290	92.3
COBALT	0	0	
IRON	100000	88450	88.4
MAGNESIUM	100000	92560	92.6
MOLYBDENUM	2000	1859	93.0
POTASSIUM	100000	94470	94.5
SODIUM	100000	94030	94.0

SAMPLE: ICSAB

File: JHG23A Jul 23, 2014 12:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92400	92.4
CALCIUM	100000	92350	92.3
COBALT	20	19	95.0
IRON	100000	88800	88.8
MAGNESIUM	100000	92310	92.3
MOLYBDENUM	2000	1899	95.0
POTASSIUM	100000	94280	94.3
SODIUM	100000	93230	93.2

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICSA

File: JHG28A Jul 28, 2014 12:59

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92410	92.4
CALCIUM	100000	91650	91.6
COBALT	0	0	
IRON	100000	86980	87.0
MAGNESIUM	100000	92540	92.5
MOLYBDENUM	2000	1830	91.5
POTASSIUM	100000	94910	94.9
SODIUM	100000	94560	94.6

SAMPLE: ICSAB

File: JHG28A Jul 28, 2014 13:02

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	91860	91.9
CALCIUM	100000	90710	90.7
COBALT	20	19	95.0
IRON	100000	85340	85.3
MAGNESIUM	100000	91970	92.0
MOLYBDENUM	2000	1862	93.1
POTASSIUM	100000	94040	94.0
SODIUM	100000	93270	93.3

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008P

Concentration Units : mg/Kg drywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	55.1		25.5		36.87	80.3		80	120	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008S

Concentration Units : mg/Kg drywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	54.9		25.5		35.55	82.7		80	120	MS

Comments:

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009P

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	505		0.30	U	500	101.0		80	120	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009S

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	494		0.30	U	500	98.8		80	120	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	83.0		81.9		2	53.5	A	75	125	MS

Comments:

FORM V (Part 2) - IN

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	1.98		0.012	U	2	98.9		75	125	MS

Comments:

FORM V (Part 2) - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008

Concentration Units : mg/Kg drywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
COBALT, TOTAL		54.9		55.1		0.4		MS

Comments:

FORM VD - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009

Concentration Units : ug/L

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
COBALT, TOTAL		494		505		2.2		MS

Comments:

FORM VD - IN

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSOHG15IMS1

Matrix: SOIL **SDG Name:** SH4986

QC Batch ID: HG15IMS1

Concentration Units : mg/Kg drywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
COBALT	50.0	48.8	97.7	80	120

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSWHG09IMW2

Matrix: WATER **SDG Name:** SH4986

QC Batch ID: HG09IMW2

Concentration Units : ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
COBALT	500	501	100.2	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Client Field ID: NAPR-W67-SB14-0507L

SDG Name: SH4986

Lab Sample ID: SH4986-008L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution	Result	C	% Difference	Q	M
COBALT, TOTAL	81.9			89.8		9.6		MS

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: WATER

Client Field ID: APR-W67-EB01-070314L

SDG Name: SH4986

Lab Sample ID: SH4986-009L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
COBALT, TOTAL	0.012	U	0.060	U			MS

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 6/11/2013

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	0.34	MS
CALCIUM	20	4.1	MS
COBALT	0.20	0.0062	MS
IRON	20	4.7	MS
MAGNESIUM	20	0.69	MS
MOLYBDENUM	1.0	0.12	MS
POTASSIUM	200	8.2	MS
SODIUM	200	3.9	MS

LIMITS of DETECTION

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/25/2011

Analyte	LOD	Units	M	EPA Prep./Anal. Method
COBALT	0.060	ug/L	MS	SW846 3010A / SW846 6020A

FORM X - IN

LIMITS of DETECTION

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/26/2011

Analyte	LOD	Units	M	EPA Prep./Anal. Method
COBALT	0.0060	mg/Kg	MS	SW846 3050B / SW846 6020A

FORM X - IN

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/25/2011

Analyte	MDL	Units	M	EPA Prep./Anal. Method
COBALT	0.012	ug/L	MS	SW846 3010A / SW846 6020A

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/26/2011

Analyte	MDL	Units	M	EPA Prep./Anal. Method
COBALT	0.0011	mg/Kg	MS	SW846 3050B / SW846 6020A

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/23/2014

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	200000	MS
CALCIUM	0.03	200000	MS
COBALT	0.10	1000	MS
IRON	0.03	100000	MS
MAGNESIUM	0.05	200000	MS
MOLYBDENUM	0.10	1000	MS
POTASSIUM	0.01	200000	MS
SODIUM	0.01	200000	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** HG09IMW2

Matrix: WATER **SDG Name:** SH4986

Method: MS **Prep Date:** 07/09/2014

Client ID	Lab Sample ID	Initial (L)	Final (L)	Bottle ID
LCSWHG09IMW2	LCSWHG09IMW2	0.05	0.05	
PBWHG09IMW2	PBWHG09IMW2	0.05	0.05	
APR-W67-EB01-070314	SH4986-009	0.05	0.05	A
APR-W67-EB01-070314P	SH4986-009P	0.05	0.05	A
APR-W67-EB01-070314S	SH4986-009S	0.05	0.05	A

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** HG15IMS1

Matrix: SOIL **SDG Name:** SH4986

Method: MS **Prep Date:** 07/15/2014

Client ID	Lab Sample ID	Initial (g)	Final (L)	Bottle ID
LCSOHG15IMS1	LCSOHG15IMS1	1	0.1	
PBSHG15IMS1	PBSHG15IMS1	1	0.1	
NAPR-W67-SB09R-0507	SH4986-001	1.68	0.1	A
APR-W67-SB09RP-0507	SH4986-002	1.77	0.1	A
NAPR-W67-SB10-0507	SH4986-003	1.81	0.1	A
NAPR-W67-SB11-0507	SH4986-004	1.4	0.1	A
NAPR-W67-SB12-0507	SH4986-005	1.7	0.1	A
NAPR-W67-SB12-0709	SH4986-006	1.7	0.1	A
NAPR-W67-SB13-0507	SH4986-007	1.78	0.1	A
NAPR-W67-SB14-0507	SH4986-008	1.92	0.1	A
NAPR-W67-SB14-0507P	SH4986-008P	1.62	0.1	A
NAPR-W67-SB14-0507S	SH4986-008S	1.68	0.1	A

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 Tune		1	11:57							
200.8 Tune		1	12:00							
Cal Blank		1	12:28	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 1		1	12:31	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 2		1	12:35	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 3		1	12:38	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 4		1	12:41	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICV		1	12:44	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICB		1	12:47	Al	Ca	Co	Fe	Mg	Mo	K	Na
PQL		1	12:50	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSA		1	12:53	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSAB		1	12:57	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:00							
CCV		1	13:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:07	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:10							
ZZZZZZ		1	13:13							
ZZZZZZ		1	13:17							
ZZZZZZ		1	13:20							
ZZZZZZ		5	13:23							
ZZZZZZ		5	13:27							
ZZZZZZ		5	13:30							
ZZZZZZ		5	13:33							
ZZZZZZ		1	13:37							
ZZZZZZ		5	13:40							
CCV		1	13:43	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:46	Al	Ca	Co	Fe	Mg	Mo	K	Na

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		1	13:50							
ZZZZZZ		5	13:53							
ZZZZZZ		5	13:56							
ZZZZZZ		5	14:00							
ZZZZZZ		5	14:03							
ZZZZZZ		5	14:06							
ZZZZZZ		5	14:10							
ZZZZZZ		5	14:13							
ZZZZZZ		5	14:16							
ZZZZZZ		5	14:20							
CCV		1	14:23	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:26	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	14:30							
ZZZZZZ		5	14:33							
ZZZZZZ		25	14:37							
ZZZZZZ		5	14:40							
ZZZZZZ		5	14:44							
ZZZZZZ		5	14:47							
ZZZZZZ		5	14:50							
ZZZZZZ		5	14:54							
ZZZZZZ		5	14:57							
ZZZZZZ		5	15:01							
CCV		1	15:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:07	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	15:11							
ZZZZZZ		1	15:14							
ZZZZZZ		1	15:18							

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		5	15:21							
ZZZZZZ		25	15:25							
ZZZZZZ		5	15:28							
ZZZZZZ		5	15:32							
ZZZZZZ		5	15:35							
ZZZZZZ		5	15:39							
ZZZZZZ		5	15:42							
CCV		1	15:46	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:49	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	15:53							
ZZZZZZ		5	15:56							
ZZZZZZ		5	16:00							
ZZZZZZ		5	16:03							
ZZZZZZ		5	16:07							
ZZZZZZ		5	16:10							
ZZZZZZ		5	16:14							
ZZZZZZ		5	16:17							
ZZZZZZ		5	16:21							
ZZZZZZ		5	16:24							
CCV		1	16:28	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	16:31	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	16:35							
ZZZZZZ		5	16:39							
ZZZZZZ		1	16:42							
ZZZZZZ		5	16:46							
ZZZZZZ		5	16:49							
ZZZZZZ		5	16:52							

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
ZZZZZZ		5	16:56								
ZZZZZZ		25	16:59								
ZZZZZZ		1	17:03								
PBWHG09IMW2		5	17:06			Co					
CCV		1	17:10	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	17:13	Al	Ca	Co	Fe	Mg	Mo	K	Na
LCSWHG09IMW2		5	17:17			Co					
SH4986-009	APR-W67-EB01-070314	5	17:20			Co					
SH4986-009L	APR-W67-EB01-070314L	25	17:24			Co					
SH4986-009A	APR-W67-EB01-070314A	5	17:27			Co					
SH4986-009S	APR-W67-EB01-070314S	5	17:31			Co					
SH4986-009P	APR-W67-EB01-070314P	5	17:34			Co					
ZZZZZZ		5	17:38								
ZZZZZZ		5	17:41								
ZZZZZZ		5	17:45								
ZZZZZZ		5	17:48								
CCV		1	17:52	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	17:55	Al	Ca	Co	Fe	Mg	Mo	K	Na

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 Tune		1	12:03							
200.8 Tune		1	12:05							
Cal Blank		1	12:34	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 1		1	12:37	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 2		1	12:40	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 3		1	12:43	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 4		1	12:46	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICV		1	12:49	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICB		1	12:53	Al	Ca	Co	Fe	Mg	Mo	K	Na
PQL		1	12:56	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSA		1	12:59	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSAB		1	13:02	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:06							
CCV		1	13:09	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:12	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:15							
ZZZZZZ		1	13:19							
ZZZZZZ		1	13:22							
CCV		1	13:25	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:29	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	13:32							
ZZZZZZ		25	13:35							
ZZZZZZ		5	13:38							
ZZZZZZ		25	13:42							
ZZZZZZ		25	13:45							
ZZZZZZ		1	13:48							
ZZZZZZ		5	13:51							

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
ZZZZZZ		1	13:54								
ZZZZZZ		1	13:58								
ZZZZZZ		1	14:01								
CCV		1	14:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:08	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	14:11								
ZZZZZZ		5	14:14								
ZZZZZZ		5	14:18								
ZZZZZZ		5	14:21								
ZZZZZZ		1	14:24								
ZZZZZZ		1	14:28								
PBSHG15IMS1		5	14:31			Co					
LCSOHG15IMS1		5	14:35			Co					
SH4986-001	NAPR-W67-SB09R-0507	5	14:38			Co					
SH4986-002	APR-W67-SB09RP-0507	5	14:41			Co					
CCV		1	14:45	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:48	Al	Ca	Co	Fe	Mg	Mo	K	Na
SH4986-003	NAPR-W67-SB10-0507	5	14:52			Co					
SH4986-004	NAPR-W67-SB11-0507	5	14:55			Co					
SH4986-005	NAPR-W67-SB12-0507	5	14:59			Co					
SH4986-006	NAPR-W67-SB12-0709	5	15:02			Co					
SH4986-007	NAPR-W67-SB13-0507	5	15:06			Co					
SH4986-008	NAPR-W67-SB14-0507	5	15:09			Co					
SH4986-008L	NAPR-W67-SB14-0507L	25	15:13			Co					
SH4986-008A	NAPR-W67-SB14-0507A	5	15:16			Co					
SH4986-008S	NAPR-W67-SB14-0507S	5	15:20			Co					
SH4986-008P	NAPR-W67-SB14-0507P	5	15:23			Co					

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
CCV		1	15:27	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:30	Al	Ca	Co	Fe	Mg	Mo	K	Na

Katahdin
ANALYTICAL SERVICES

ACCREDITED IN ACCORDANCE WITH nelac
Cert No E87604

Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-1
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB09R-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	83. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:41:49	SM2540G	11-JUL-14	

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Cert No E87604

Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-2
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
APR-W67-SB09RP-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	82. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:03	SM2540G	11-JUL-14	

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Katahdin
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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-3
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB10-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	84. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:17	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-4
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB11-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	87. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:31	SM2540G	11-JUL-14	

Katahdin Analytical Services A0000062

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-5
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB12-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	82. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:44	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-6
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB12-0709	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	77. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:43:08	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-7
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB13-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	87. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:44:00	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-8
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB14-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	84. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:44:18	SM2540G	11-JUL-14	

Katahdin Analytical Services A0000066

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG146313	SM2540	12-JUL-14	11-JUL-14	U 1 %	1 %	N/A

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Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG146313-2	LCS	WG146313	12-JUL-14	11-JUL-14	%	90	92.	103	80-120	

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Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG146313-3	SH4986-1	WG146313	12-JUL-14	%	83.	84.	1	20

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METALS DATA

Sample Data Section

METALS SAMPLE FLAGGING

FLAG	SPECIFIED MEANING
E	The reported value is estimated because of the presence of interference (as indicated by serial dilution).
N	The pre-digestion spiked sample recovery is not within control limits.
*	The duplicate sample analysis relative percent difference (RPD) is not within control limits.
B	Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.
A	The post-digestion spiked sample recovery is not within control limits.
•	Analytical run QC sample (e.g. ICV, CCV, ICB, CCB, ICSA, ICSAB) not within control limits.
U	The analyte was not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client. Note: All results reported as “U” MDL have a 50% rate for false negatives compared to those results reported as “U” PQL/LOQ or “U” LOD, where the rate of false negatives is <1%.
J	The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ) (previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: Katahdin Analytical Services

SDG Name: SH4986 **SOW No.** SW846

Client Field ID	Lab Sample ID
APR-W67-EB01-070314	SH4986-009
APR-W67-EB01-070314	SH4986-009P
APR-W67-EB01-070314	SH4986-009S
APR-W67-SB09RP-0507	SH4986-002
NAPR-W67-SB09R-0507	SH4986-001
NAPR-W67-SB10-0507	SH4986-003
NAPR-W67-SB11-0507	SH4986-004
NAPR-W67-SB12-0507	SH4986-005
NAPR-W67-SB12-0709	SH4986-006
NAPR-W67-SB13-0507	SH4986-007
NAPR-W67-SB14-0507	SH4986-008
NAPR-W67-SB14-0507	SH4986-008P
NAPR-W67-SB14-0507	SH4986-008S

Were ICP interelement corrections applied ?	Yes
Were ICP background corrections applied ?	Yes
If yes - were raw data generated before application of background corrections ?	No

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Heather Mayz Name: Heather Mayz

Date: 7-30-14 Title: Analyst I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB09R-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.9 **Lab Sample ID:** SH4986-001

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	24.8			MS	5	0.072	0.0039	0.022

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-SB09RP-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-002

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	25.9			MS	5	0.069	0.0038	0.021

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB10-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.6 **Lab Sample ID:** SH4986-003

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	18.8			MS	5	0.066	0.0036	0.020

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB11-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 86.6 **Lab Sample ID:** SH4986-004

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	26.1			MS	5	0.082	0.0045	0.025

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-005

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	36.2			MS	5	0.072	0.0039	0.021

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0709

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 77.4 **Lab Sample ID:** SH4986-006

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	29.3			MS	5	0.076	0.0042	0.023

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB13-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 87.3 **Lab Sample ID:** SH4986-007

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	36.5			MS	5	0.064	0.0035	0.019

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008

Concentration Units : mg/Kg drywt

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	25.5		A	MS	5	0.062	0.0034	0.019

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009

Concentration Units : ug/L

							ADJUSTED		
CAS No.	**Analyte**	**Concentration**	**C**	**Q**	**M**	**DF**	**LOQ**	**MDL**	**LOD**
7440-48-4	COBALT, TOTAL	0.30	U		MS	5	1.0	0.060	0.30

Comments:

QC Summary Section

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICV

File: JHG23A Jul 23, 2014 12:44

Analyte	True	Found	%R (1)
ALUMINUM	400.0	398.70	99.7
CALCIUM	4000.0	4072.00	101.8
COBALT	20.0	20.11	100.6
IRON	4000.0	4053.00	101.3
MAGNESIUM	4000.0	4056.00	101.4
MOLYBDENUM	40.0	41.06	102.6
POTASSIUM	4000.0	4003.00	100.1
SODIUM	4000.0	3991.00	99.8

SAMPLE: CCV

File: JHG23A Jul 23, 2014 13:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	489.70	97.9
CALCIUM	5000.0	5001.00	100.0
COBALT	25.0	24.17	96.7
IRON	5000.0	4952.00	99.0
MAGNESIUM	5000.0	4871.00	97.4
MOLYBDENUM	25.0	25.07	100.3
POTASSIUM	5000.0	4862.00	97.2
SODIUM	5000.0	4855.00	97.1

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 13:43

Analyte	True	Found	%R (1)
ALUMINUM	500.0	489.30	97.9
CALCIUM	5000.0	4881.00	97.6
COBALT	25.0	23.75	95.0
IRON	5000.0	4837.00	96.7
MAGNESIUM	5000.0	4852.00	97.0
MOLYBDENUM	25.0	24.25	97.0
POTASSIUM	5000.0	4808.00	96.2
SODIUM	5000.0	4827.00	96.5

SAMPLE: CCV

File: JHG23A Jul 23, 2014 14:23

Analyte	True	Found	%R (1)
ALUMINUM	500.0	515.60	103.1
CALCIUM	5000.0	4943.00	98.9
COBALT	25.0	24.15	96.6
IRON	5000.0	4938.00	98.8
MAGNESIUM	5000.0	4950.00	99.0
MOLYBDENUM	25.0	24.72	98.9
POTASSIUM	5000.0	4894.00	97.9
SODIUM	5000.0	4914.00	98.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 15:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	498.60	99.7
CALCIUM	5000.0	5033.00	100.7
COBALT	25.0	24.53	98.1
IRON	5000.0	4978.00	99.6
MAGNESIUM	5000.0	4942.00	98.8
MOLYBDENUM	25.0	25.11	100.4
POTASSIUM	5000.0	4907.00	98.1
SODIUM	5000.0	4905.00	98.1

SAMPLE: CCV

File: JHG23A Jul 23, 2014 15:46

Analyte	True	Found	%R (1)
ALUMINUM	500.0	502.00	100.4
CALCIUM	5000.0	4997.00	99.9
COBALT	25.0	24.06	96.2
IRON	5000.0	4917.00	98.3
MAGNESIUM	5000.0	4914.00	98.3
MOLYBDENUM	25.0	25.04	100.2
POTASSIUM	5000.0	4867.00	97.3
SODIUM	5000.0	4873.00	97.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 16:28

Analyte	True	Found	%R (1)
ALUMINUM	500.0	509.90	102.0
CALCIUM	5000.0	5064.00	101.3
COBALT	25.0	24.56	98.2
IRON	5000.0	4990.00	99.8
MAGNESIUM	5000.0	4901.00	98.0
MOLYBDENUM	25.0	24.98	99.9
POTASSIUM	5000.0	4936.00	98.7
SODIUM	5000.0	4832.00	96.6

SAMPLE: CCV

File: JHG23A Jul 23, 2014 17:10

Analyte	True	Found	%R (1)
ALUMINUM	500.0	488.80	97.8
CALCIUM	5000.0	4959.00	99.2
COBALT	25.0	24.29	97.2
IRON	5000.0	4974.00	99.5
MAGNESIUM	5000.0	4826.00	96.5
MOLYBDENUM	25.0	24.61	98.4
POTASSIUM	5000.0	4827.00	96.5
SODIUM	5000.0	4771.00	95.4

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG23A Jul 23, 2014 17:52

Analyte	True	Found	%R (1)
ALUMINUM	500.0	520.90	104.2
CALCIUM	5000.0	5039.00	100.8
COBALT	25.0	24.54	98.2
IRON	5000.0	5075.00	101.5
MAGNESIUM	5000.0	5057.00	101.1
MOLYBDENUM	25.0	25.55	102.2
POTASSIUM	5000.0	4963.00	99.3
SODIUM	5000.0	4986.00	99.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICV

File: JHG28A Jul 28, 2014 12:49

Analyte	True	Found	%R (1)
ALUMINUM	400.0	400.30	100.1
CALCIUM	4000.0	3890.00	97.3
COBALT	20.0	20.27	101.4
IRON	4000.0	3944.00	98.6
MAGNESIUM	4000.0	4086.00	102.2
MOLYBDENUM	40.0	41.33	103.3
POTASSIUM	4000.0	3977.00	99.4
SODIUM	4000.0	3950.00	98.8

SAMPLE: CCV

File: JHG28A Jul 28, 2014 13:09

Analyte	True	Found	%R (1)
ALUMINUM	500.0	493.20	98.6
CALCIUM	5000.0	4846.00	96.9
COBALT	25.0	24.41	97.6
IRON	5000.0	4764.00	95.3
MAGNESIUM	5000.0	4956.00	99.1
MOLYBDENUM	25.0	25.28	101.1
POTASSIUM	5000.0	4872.00	97.4
SODIUM	5000.0	4886.00	97.7

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG28A Jul 28, 2014 13:25

Analyte	True	Found	%R (1)
ALUMINUM	500.0	491.10	98.2
CALCIUM	5000.0	4830.00	96.6
COBALT	25.0	24.47	97.9
IRON	5000.0	4784.00	95.7
MAGNESIUM	5000.0	4953.00	99.1
MOLYBDENUM	25.0	24.88	99.5
POTASSIUM	5000.0	4853.00	97.1
SODIUM	5000.0	4869.00	97.4

SAMPLE: CCV

File: JHG28A Jul 28, 2014 14:04

Analyte	True	Found	%R (1)
ALUMINUM	500.0	495.70	99.1
CALCIUM	5000.0	4874.00	97.5
COBALT	25.0	24.44	97.8
IRON	5000.0	4798.00	96.0
MAGNESIUM	5000.0	4938.00	98.8
MOLYBDENUM	25.0	24.92	99.7
POTASSIUM	5000.0	4909.00	98.2
SODIUM	5000.0	4876.00	97.5

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCV

File: JHG28A Jul 28, 2014 14:45

Analyte	True	Found	%R (1)
ALUMINUM	500.0	504.50	100.9
CALCIUM	5000.0	4853.00	97.1
COBALT	25.0	24.58	98.3
IRON	5000.0	4851.00	97.0
MAGNESIUM	5000.0	4992.00	99.8
MOLYBDENUM	25.0	24.99	100.0
POTASSIUM	5000.0	4947.00	98.9
SODIUM	5000.0	5146.00	102.9

SAMPLE: CCV

File: JHG28A Jul 28, 2014 15:27

Analyte	True	Found	%R (1)
ALUMINUM	500.0	516.30	103.3
CALCIUM	5000.0	4867.00	97.3
COBALT	25.0	24.47	97.9
IRON	5000.0	4816.00	96.3
MAGNESIUM	5000.0	5083.00	101.7
MOLYBDENUM	25.0	25.19	100.8
POTASSIUM	5000.0	4952.00	99.0
SODIUM	5000.0	5015.00	100.3

(1) Control Limits: Mercury 80-120; Other Metals 90-110

FORM II (Part 1) - IN

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: PQL

File: JHG23A Jul 23, 2014 12:50

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	60.53	100.9
CALCIUM	20.0	18.80	94.0
COBALT	0.2	0.19	95.0
IRON	20.0	25.99	129.9•
MAGNESIUM	20.0	20.27	101.4
MOLYBDENUM	1.0	1.00	100.0
POTASSIUM	200.0	204.10	102.1
SODIUM	200.0	209.90	105.0

2C

PQL STANDARD FOR AA AND ICP

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: PQL

File: JHG28A Jul 28, 2014 12:56

Analyte	TRUE	FOUND	% R
ALUMINUM	60.0	61.57	102.6
CALCIUM	20.0	24.09	120.4
COBALT	0.2	0.22	110.0
IRON	20.0	22.40	112.0
MAGNESIUM	20.0	20.68	103.4
MOLYBDENUM	1.0	1.04	104.0
POTASSIUM	200.0	204.00	102.0
SODIUM	200.0	212.10	106.1

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICB

File: JHG23A Jul 23, 2014 12:47

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	-0.011	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.133	J
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 13:07

Analyte	Result	C
ALUMINUM	0.506	J
CALCIUM	4.100	U
COBALT	-0.017	U
IRON	-12.790	U
MAGNESIUM	2.128	J
MOLYBDENUM	0.331	J
POTASSIUM	8.200	U
SODIUM	5.730	J

SAMPLE: CCB

File: JHG23A Jul 23, 2014 13:46

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	-10.520	U
COBALT	-0.016	U
IRON	-8.950	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG23A Jul 23, 2014 14:26

Analyte	Result	C
ALUMINUM	3.791	J
CALCIUM	-8.912	U
COBALT	-0.017	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 15:07

Analyte	Result	C
ALUMINUM	2.117	J
CALCIUM	-9.665	U
COBALT	-0.014	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 15:49

Analyte	Result	C
ALUMINUM	7.949	J
CALCIUM	-8.561	U
COBALT	-0.009	U
IRON	7.312	J
MAGNESIUM	1.487	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	4.612	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG23A Jul 23, 2014 16:31

Analyte	Result	C
ALUMINUM	6.000	J
CALCIUM	-9.481	U
COBALT	-0.019	U
IRON	4.700	U
MAGNESIUM	0.751	J
MOLYBDENUM	0.120	U
POTASSIUM	-14.010	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 17:13

Analyte	Result	C
ALUMINUM	1.719	J
CALCIUM	-9.237	U
COBALT	-0.010	U
IRON	4.700	U
MAGNESIUM	0.913	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG23A Jul 23, 2014 17:55

Analyte	Result	C
ALUMINUM	5.211	J
CALCIUM	-13.680	U
COBALT	-0.012	U
IRON	14.910	B
MAGNESIUM	1.865	J
MOLYBDENUM	0.120	U
POTASSIUM	12.140	J
SODIUM	3.900	U

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICB

File: JHG28A Jul 28, 2014 12:53

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	-4.203	U
COBALT	0.006	U
IRON	4.700	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.146	J
POTASSIUM	8.200	U
SODIUM	3.900	U

SAMPLE: CCB

File: JHG28A Jul 28, 2014 13:12

Analyte	Result	C
ALUMINUM	0.679	J
CALCIUM	4.100	U
COBALT	-0.015	U
IRON	-15.940	U
MAGNESIUM	1.941	J
MOLYBDENUM	0.423	B
POTASSIUM	-14.290	U
SODIUM	6.722	J

SAMPLE: CCB

File: JHG28A Jul 28, 2014 13:29

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	-0.012	U
IRON	-17.950	U
MAGNESIUM	0.726	J
MOLYBDENUM	0.153	J
POTASSIUM	-13.190	U
SODIUM	4.432	J

3A

INITIAL AND CONTINUING CALIBRATION BLANKS

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: CCB

File: JHG28A Jul 28, 2014 14:08

Analyte	Result	C
ALUMINUM	0.340	U
CALCIUM	4.100	U
COBALT	0.006	U
IRON	-8.611	U
MAGNESIUM	0.690	U
MOLYBDENUM	0.120	U
POTASSIUM	-10.750	U
SODIUM	6.179	J

SAMPLE: CCB

File: JHG28A Jul 28, 2014 14:48

Analyte	Result	C
ALUMINUM	0.545	J
CALCIUM	-5.803	U
COBALT	0.006	U
IRON	-6.456	U
MAGNESIUM	1.654	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	214.900	B

SAMPLE: CCB

File: JHG28A Jul 28, 2014 15:30

Analyte	Result	C
ALUMINUM	0.646	J
CALCIUM	-12.650	U
COBALT	-0.008	U
IRON	-8.747	U
MAGNESIUM	0.871	J
MOLYBDENUM	0.120	U
POTASSIUM	8.200	U
SODIUM	31.690	J

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBSHG15IMS1

Matrix: SOIL **SDG Name:** SH4986

QC Batch ID: HG15IMS1

Concentration Units : mg/Kg drywt

Analyte	RESULT	C
COBALT	0.030	U

3P

PREPARATION BLANKS

Lab Name: Katahdin Analytical Services **Sample ID:** PBWHG09IMW2

Matrix: WATER **SDG Name:** SH4986

QC Batch ID: HG09IMW2

Concentration Units : ug/L

Analyte	RESULT	C
COBALT	0.30	U

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICSA

File: JHG23A Jul 23, 2014 12:53

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92720	92.7
CALCIUM	100000	92290	92.3
COBALT	0	0	
IRON	100000	88450	88.4
MAGNESIUM	100000	92560	92.6
MOLYBDENUM	2000	1859	93.0
POTASSIUM	100000	94470	94.5
SODIUM	100000	94030	94.0

SAMPLE: ICSAB

File: JHG23A Jul 23, 2014 12:57

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92400	92.4
CALCIUM	100000	92350	92.3
COBALT	20	19	95.0
IRON	100000	88800	88.8
MAGNESIUM	100000	92310	92.3
MOLYBDENUM	2000	1899	95.0
POTASSIUM	100000	94280	94.3
SODIUM	100000	93230	93.2

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Concentration Units: ug/L

SAMPLE: ICSA

File: JHG28A Jul 28, 2014 12:59

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	92410	92.4
CALCIUM	100000	91650	91.6
COBALT	0	0	
IRON	100000	86980	87.0
MAGNESIUM	100000	92540	92.5
MOLYBDENUM	2000	1830	91.5
POTASSIUM	100000	94910	94.9
SODIUM	100000	94560	94.6

SAMPLE: ICSAB

File: JHG28A Jul 28, 2014 13:02

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	91860	91.9
CALCIUM	100000	90710	90.7
COBALT	20	19	95.0
IRON	100000	85340	85.3
MAGNESIUM	100000	91970	92.0
MOLYBDENUM	2000	1862	93.1
POTASSIUM	100000	94040	94.0
SODIUM	100000	93270	93.3

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008P

Concentration Units : mg/Kg drywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	55.1		25.5		36.87	80.3		80	120	MS

Comments:

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008S

Concentration Units : mg/Kg drywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	54.9		25.5		35.55	82.7		80	120	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009P

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	505		0.30	U	500	101.0		80	120	MS

Comments:

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009S

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	494		0.30	U	500	98.8		80	120	MS

Comments:

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	83.0		81.9		2	53.5	A	75	125	MS

Comments:

FORM V (Part 2) - IN

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314S

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	1.98		0.012	U	2	98.9		75	125	MS

Comments:

FORM V (Part 2) - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008

Concentration Units : mg/Kg drywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
COBALT, TOTAL		54.9		55.1		0.4		MS

Comments:

FORM VD - IN

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009

Concentration Units : ug/L

Analyte	Control Limits	Spike Result	C	Spike Dup. Result	C	RPD	Q	M
COBALT, TOTAL		494		505		2.2		MS

Comments:

FORM VD - IN

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSOHG15IMS1

Matrix: SOIL **SDG Name:** SH4986

QC Batch ID: HG15IMS1

Concentration Units : mg/Kg drywt

Analyte	TRUE	FOUND	% R	LIMITS (%)	
COBALT	50.0	48.8	97.7	80	120

LABORATORY CONTROL SAMPLES

Lab Name: Katahdin Analytical Services **Sample ID:** LCSWHG09IMW2

Matrix: WATER **SDG Name:** SH4986

QC Batch ID: HG09IMW2

Concentration Units : ug/L

Analyte	TRUE	FOUND	% R	LIMITS (%)	
COBALT	500	501	100.2	80	120

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: SOIL

Client Field ID: NAPR-W67-SB14-0507L

SDG Name: SH4986

Lab Sample ID: SH4986-008L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution	Result	C	% Difference	Q	M
COBALT, TOTAL	81.9			89.8		9.6		MS

ICP SERIAL DILUTION

Lab Name: Katahdin Analytical Services

Matrix: WATER

Client Field ID: APR-W67-EB01-070314L

SDG Name: SH4986

Lab Sample ID: SH4986-009L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M
COBALT, TOTAL	0.012	U	0.060	U			MS

INSTRUMENT DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 6/11/2013

Concentration Units: ug/L

Analyte	CRDL	IDL	M
ALUMINUM	60	0.34	MS
CALCIUM	20	4.1	MS
COBALT	0.20	0.0062	MS
IRON	20	4.7	MS
MAGNESIUM	20	0.69	MS
MOLYBDENUM	1.0	0.12	MS
POTASSIUM	200	8.2	MS
SODIUM	200	3.9	MS

LIMITS of DETECTION

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/25/2011

Analyte	LOD	Units	M	EPA Prep./Anal. Method
COBALT	0.060	ug/L	MS	SW846 3010A / SW846 6020A

FORM X - IN

LIMITS of DETECTION

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/26/2011

Analyte	LOD	Units	M	EPA Prep./Anal. Method
COBALT	0.0060	mg/Kg	MS	SW846 3050B / SW846 6020A

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/25/2011

Analyte	MDL	Units	M	EPA Prep./Anal. Method
COBALT	0.012	ug/L	MS	SW846 3010A / SW846 6020A

METHOD DETECTION LIMITS

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/26/2011

Analyte	MDL	Units	M	EPA Prep./Anal. Method
COBALT	0.0011	mg/Kg	MS	SW846 3050B / SW846 6020A

ICP LINEAR RANGES

Lab Name: Katahdin Analytical Services **Instrument Code:** J

Instrument Name: AGILENT 7500 ICP-MS **Date:** 1/23/2014

Concentration Units: ug/L

Analyte	Integration Time (sec)	Linear Range	M
ALUMINUM	0.01	200000	MS
CALCIUM	0.03	200000	MS
COBALT	0.10	1000	MS
IRON	0.03	100000	MS
MAGNESIUM	0.05	200000	MS
MOLYBDENUM	0.10	1000	MS
POTASSIUM	0.01	200000	MS
SODIUM	0.01	200000	MS

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** HG09IMW2

Matrix: WATER **SDG Name:** SH4986

Method: MS **Prep Date:** 07/09/2014

Client ID	Lab Sample ID	Initial (L)	Final (L)	Bottle ID
LCSWHG09IMW2	LCSWHG09IMW2	0.05	0.05	
PBWHG09IMW2	PBWHG09IMW2	0.05	0.05	
APR-W67-EB01-070314	SH4986-009	0.05	0.05	A
APR-W67-EB01-070314P	SH4986-009P	0.05	0.05	A
APR-W67-EB01-070314S	SH4986-009S	0.05	0.05	A

PREPARATION LOG

Lab Name: Katahdin Analytical Services **QC Batch ID:** HG15IMS1

Matrix: SOIL **SDG Name:** SH4986

Method: MS **Prep Date:** 07/15/2014

Client ID	Lab Sample ID	Initial (g)	Final (L)	Bottle ID
LCSOHG15IMS1	LCSOHG15IMS1	1	0.1	
PBSHG15IMS1	PBSHG15IMS1	1	0.1	
NAPR-W67-SB09R-0507	SH4986-001	1.68	0.1	A
APR-W67-SB09RP-0507	SH4986-002	1.77	0.1	A
NAPR-W67-SB10-0507	SH4986-003	1.81	0.1	A
NAPR-W67-SB11-0507	SH4986-004	1.4	0.1	A
NAPR-W67-SB12-0507	SH4986-005	1.7	0.1	A
NAPR-W67-SB12-0709	SH4986-006	1.7	0.1	A
NAPR-W67-SB13-0507	SH4986-007	1.78	0.1	A
NAPR-W67-SB14-0507	SH4986-008	1.92	0.1	A
NAPR-W67-SB14-0507P	SH4986-008P	1.62	0.1	A
NAPR-W67-SB14-0507S	SH4986-008S	1.68	0.1	A

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 Tune		1	11:57							
200.8 Tune		1	12:00							
Cal Blank		1	12:28	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 1		1	12:31	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 2		1	12:35	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 3		1	12:38	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 4		1	12:41	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICV		1	12:44	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICB		1	12:47	Al	Ca	Co	Fe	Mg	Mo	K	Na
PQL		1	12:50	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSA		1	12:53	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSAB		1	12:57	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:00							
CCV		1	13:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:07	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:10							
ZZZZZZ		1	13:13							
ZZZZZZ		1	13:17							
ZZZZZZ		1	13:20							
ZZZZZZ		5	13:23							
ZZZZZZ		5	13:27							
ZZZZZZ		5	13:30							
ZZZZZZ		5	13:33							
ZZZZZZ		1	13:37							
ZZZZZZ		5	13:40							
CCV		1	13:43	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:46	Al	Ca	Co	Fe	Mg	Mo	K	Na

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		1	13:50							
ZZZZZZ		5	13:53							
ZZZZZZ		5	13:56							
ZZZZZZ		5	14:00							
ZZZZZZ		5	14:03							
ZZZZZZ		5	14:06							
ZZZZZZ		5	14:10							
ZZZZZZ		5	14:13							
ZZZZZZ		5	14:16							
ZZZZZZ		5	14:20							
CCV		1	14:23	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:26	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	14:30							
ZZZZZZ		5	14:33							
ZZZZZZ		25	14:37							
ZZZZZZ		5	14:40							
ZZZZZZ		5	14:44							
ZZZZZZ		5	14:47							
ZZZZZZ		5	14:50							
ZZZZZZ		5	14:54							
ZZZZZZ		5	14:57							
ZZZZZZ		5	15:01							
CCV		1	15:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:07	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	15:11							
ZZZZZZ		1	15:14							
ZZZZZZ		1	15:18							

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
ZZZZZZ		5	15:21							
ZZZZZZ		25	15:25							
ZZZZZZ		5	15:28							
ZZZZZZ		5	15:32							
ZZZZZZ		5	15:35							
ZZZZZZ		5	15:39							
ZZZZZZ		5	15:42							
CCV		1	15:46	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:49	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	15:53							
ZZZZZZ		5	15:56							
ZZZZZZ		5	16:00							
ZZZZZZ		5	16:03							
ZZZZZZ		5	16:07							
ZZZZZZ		5	16:10							
ZZZZZZ		5	16:14							
ZZZZZZ		5	16:17							
ZZZZZZ		5	16:21							
ZZZZZZ		5	16:24							
CCV		1	16:28	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	16:31	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	16:35							
ZZZZZZ		5	16:39							
ZZZZZZ		1	16:42							
ZZZZZZ		5	16:46							
ZZZZZZ		5	16:49							
ZZZZZZ		5	16:52							

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG23A

Date: 7/23/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
ZZZZZZ		5	16:56								
ZZZZZZ		25	16:59								
ZZZZZZ		1	17:03								
PBWHG09IMW2		5	17:06			Co					
CCV		1	17:10	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	17:13	Al	Ca	Co	Fe	Mg	Mo	K	Na
LCSWHG09IMW2		5	17:17			Co					
SH4986-009	APR-W67-EB01-070314	5	17:20			Co					
SH4986-009L	APR-W67-EB01-070314L	25	17:24			Co					
SH4986-009A	APR-W67-EB01-070314A	5	17:27			Co					
SH4986-009S	APR-W67-EB01-070314S	5	17:31			Co					
SH4986-009P	APR-W67-EB01-070314P	5	17:34			Co					
ZZZZZZ		5	17:38								
ZZZZZZ		5	17:41								
ZZZZZZ		5	17:45								
ZZZZZZ		5	17:48								
CCV		1	17:52	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	17:55	Al	Ca	Co	Fe	Mg	Mo	K	Na

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements						
6020 Tune		1	12:03							
200.8 Tune		1	12:05							
Cal Blank		1	12:34	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 1		1	12:37	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 2		1	12:40	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 3		1	12:43	Al	Ca	Co	Fe	Mg	Mo	K	Na
Cal Std 4		1	12:46	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICV		1	12:49	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICB		1	12:53	Al	Ca	Co	Fe	Mg	Mo	K	Na
PQL		1	12:56	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSA		1	12:59	Al	Ca	Co	Fe	Mg	Mo	K	Na
ICSAB		1	13:02	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:06							
CCV		1	13:09	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:12	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		1	13:15							
ZZZZZZ		1	13:19							
ZZZZZZ		1	13:22							
CCV		1	13:25	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	13:29	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	13:32							
ZZZZZZ		25	13:35							
ZZZZZZ		5	13:38							
ZZZZZZ		25	13:42							
ZZZZZZ		25	13:45							
ZZZZZZ		1	13:48							
ZZZZZZ		5	13:51							

FORM XIV - IN

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
ZZZZZZ		1	13:54								
ZZZZZZ		1	13:58								
ZZZZZZ		1	14:01								
CCV		1	14:04	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:08	Al	Ca	Co	Fe	Mg	Mo	K	Na
ZZZZZZ		5	14:11								
ZZZZZZ		5	14:14								
ZZZZZZ		5	14:18								
ZZZZZZ		5	14:21								
ZZZZZZ		1	14:24								
ZZZZZZ		1	14:28								
PBSHG15IMS1		5	14:31			Co					
LCSOHG15IMS1		5	14:35			Co					
SH4986-001	NAPR-W67-SB09R-0507	5	14:38			Co					
SH4986-002	APR-W67-SB09RP-0507	5	14:41			Co					
CCV		1	14:45	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	14:48	Al	Ca	Co	Fe	Mg	Mo	K	Na
SH4986-003	NAPR-W67-SB10-0507	5	14:52			Co					
SH4986-004	NAPR-W67-SB11-0507	5	14:55			Co					
SH4986-005	NAPR-W67-SB12-0507	5	14:59			Co					
SH4986-006	NAPR-W67-SB12-0709	5	15:02			Co					
SH4986-007	NAPR-W67-SB13-0507	5	15:06			Co					
SH4986-008	NAPR-W67-SB14-0507	5	15:09			Co					
SH4986-008L	NAPR-W67-SB14-0507L	25	15:13			Co					
SH4986-008A	NAPR-W67-SB14-0507A	5	15:16			Co					
SH4986-008S	NAPR-W67-SB14-0507S	5	15:20			Co					
SH4986-008P	NAPR-W67-SB14-0507P	5	15:23			Co					

ANALYSIS RUN LOG

Lab Name: Katahdin Analytical Services **SDG Name:** SH4986

Instrument ID: AGILENT 7500 ICP-MS **File Name:** JHG28A

Date: 7/28/2014 **Method:** MS

Lab Sample ID	Client ID	D.F.	Time	Elements							
CCV		1	15:27	Al	Ca	Co	Fe	Mg	Mo	K	Na
CCB		1	15:30	Al	Ca	Co	Fe	Mg	Mo	K	Na

Raw Data Section

KATAHDIN ANALYTICAL SERVICES, INC.
METALS ANALYSIS RUN INFORMATION SHEET

INSTR. ID: J-Agilent 7500 **ANALYST:** Eon **ANALYSIS DATE:** 07-23-14

FILE NAME: JH623A

REVIEWED

MMM 7-28-14

KATAHDIN ANALYTICAL METALS SECTION

METHOD:

ICP	ICP-MS	CVAA
☐ 200.7	☑ 200.8	☐ 245.__
☐ 6010B	☑ 6020	☐ 747___
☐ CLP	☐ CLP	☐ CLP
☐ _____	☐ _____	☐ _____

STANDARDS USED:

Standard Name	Standard ID	Prep Date	Expiration Date	Standard Conc.
CalBlank/ICB/CCB	MW14962	06-30-14	06-30-15	0 ug/L
Cal. Std 1	MW14989	07-14-14	08-08-14	varies by element
2	MW14990			
3	MW14991			
4	MW14992			
ICV	MW15010	07-22-14	10-22-14	
PQL	MW14995	07-15-14	08-08-14	
ICSA	MW15007	07-22-14	07-29-14	
ICSAB	MW15008			
CCV	MW15011	07-23-14	08-08-14	
Internal Std	MW15001	07-17-14	10-17-14	1 mg/L

Additional Comments and Notes:

MMM 7-28-14

INSTRUMENT RUNLOG

Instrument: AGILENT 7500

SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
6020 Tune	1	JHG23A	7/23/2014 11:57:0	11:57	EAM
200.8 Tune	1	JHG23A	7/23/2014 12:00:0	12:00	EAM
Cal Blank	1	JHG23A	7/23/2014 12:28:0	12:28	EAM
Cal Std 1	1	JHG23A	7/23/2014 12:31:0	12:31	EAM
Cal Std 2	1	JHG23A	7/23/2014 12:35:0	12:35	EAM
Cal Std 3	1	JHG23A	7/23/2014 12:38:0	12:38	EAM
Cal Std 4	1	JHG23A	7/23/2014 12:41:0	12:41	EAM
ICV	1	JHG23A	7/23/2014 12:44:0	12:44	EAM
ICB	1	JHG23A	7/23/2014 12:47:0	12:47	EAM
PQL	1	JHG23A	7/23/2014 12:50:0	12:50	EAM
ICSA	1	JHG23A	7/23/2014 12:53:0	12:53	EAM
ICSAB	1	JHG23A	7/23/2014 12:57:0	12:57	EAM
Blank	1	JHG23A	7/23/2014 1:00:00	13:00	EAM
CCV	1	JHG23A	7/23/2014 1:04:00	13:04	EAM
CCB	1	JHG23A	7/23/2014 1:07:00	13:07	EAM
SH5482-001	1	JHG23A	7/23/2014 1:10:00	13:10	EAM
SH5407-001	1	JHG23A	7/23/2014 1:13:00	13:13	EAM
SH5408-001	1	JHG23A	7/23/2014 I:17:00	13:17	EAM
SH5409-001	1	JHG23A	7/23/2014 1:20:00	13:20	EAM
SH5194-001	5	JHG23A	7/23/2014 1:23:00	13:23	EAM
SH5194-002	5	JHG23A	7/23/2014 1:27:00	13:27	EAM
SH5194-003	5	JHG23A	7/23/2014 1:30:00	13:30	EAM
SH5194-004	5	JHG23A	7/23/2014 1:33:00	13:33	EAM
PBWHG17IMW1	1	JHG23A	7/23/2014 1:37:00	13:37	EAM
LCSWHG17IMW1	5	JHG23A	7/23/2014 1:40:00	13:40	EAM
CCV	1	JHG23A	7/23/2014 1:43:00	13:43	EAM
CCB	1	JHG23A	7/23/2014 1:46:00	13:46	EAM
SH5266-001	1	JHG23A	7/23/2014 1:50:00	13:50	EAM
PBSHG16IMS1	5	JHG23A	7/23/2014 1:53:00	13:53	EAM
LCSOHG16IMS1	5	JHG23A	7/23/2014 1:56:00	13:56	EAM
SH4736-008	5	JHG23A	7/23/2014 2:00:00	14:00	EAM
SH4736-010	5	JHG23A	7/23/2014 2:03:00	14:03	EAM
SH4736-012	5	JHG23A	7/23/2014 2:06:00	14:06	EAM
SH4736-016	5	JHG23A	7/23/2014 2:10:00	14:10	EAM
SH4736-018	5	JHG23A	7/23/2014 2:13:00	14:13	EAM
SH4736-020	5	JHG23A	7/23/2014 2:16:00	14:16	EAM
SH4736-022	5	JHG23A	7/23/2014 2:20:00	14:20	EAM
CCV	1	JHG23A	7/23/2014 2:23:00	14:23	EAM
CCB	1	JHG23A	7/23/2014 2:26:00	14:26	EAM
SH4736-024	5	JHG23A	7/23/2014 2:30:00	14:30	EAM
SH4736-029	5	JHG23A	7/23/2014 2:33:00	14:33	EAM
SH4736-029L	25	JHG23A	7/23/2014 2:37:00	14:37	EAM
SH4736-029A	5	JHG23A	7/23/2014 2:40:00	14:40	EAM
SH4736-029S	5	JHG23A	7/23/2014 2:44:00	14:44	EAM

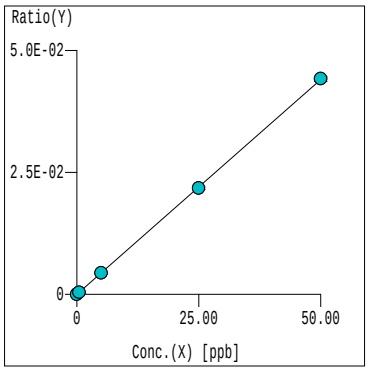
SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
SH4736-029P	5	JHG23A	7/23/2014 2:47:00	14:47	EAM
SH4736-031	5	JHG23A	7/23/2014 2:50:00	14:50	EAM
SH4736-033	5	JHG23A	7/23/2014 2:54:00	14:54	EAM
SH4736-035	5	JHG23A	7/23/2014 2:57:00	14:57	EAM
SH4736-039	5	JHG23A	7/23/2014 3:01:00	15:01	EAM
CCV	1	JHG23A	7/23/2014 3:04:00	15:04	EAM
CCB	1	JHG23A	7/23/2014 3:07:00	15:07	EAM
SH5267-001	1	JHG23A	7/23/2014 3:11:00	15:11	EAM
SH5279-001	1	JHG23A	7/23/2014 3:14:00	15:14	EAM
SH5281-001	1	JHG23A	7/23/2014 3:18:00	15:18	EAM
SH4736-005	5	JHG23A	7/23/2014 3:21:00	15:21	EAM
SH4736-005L	25	JHG23A	7/23/2014 3:25:00	15:25	EAM
SH4736-005A	5	JHG23A	7/23/2014 3:28:00	15:28	EAM
SH4736-005S	5	JHG23A	7/23/2014 3:32:00	15:32	EAM
SH4736-005P	5	JHG23A	7/23/2014 3:35:00	15:35	EAM
SH4736-041	5	JHG23A	7/23/2014 3:39:00	15:39	EAM
SH4736-043	5	JHG23A	7/23/2014 3:42:00	15:42	EAM
CCV	1	JHG23A	7/23/2014 3:46:00	15:46	EAM
CCB	1	JHG23A	7/23/2014 3:49:00	15:49	EAM
SH4736-045	5	JHG23A	7/23/2014 3:53:00	15:53	EAM
SH4736-047	5	JHG23A	7/23/2014 3:56:00	15:56	EAM
SH4736-051	5	JHG23A	7/23/2014 4:00:00	16:00	EAM
SH4736-053	5	JHG23A	7/23/2014 4:03:00	16:03	EAM
SH4736-057	5	JHG23A	7/23/2014 4:07:00	16:07	EAM
SH4736-059	5	JHG23A	7/23/2014 4:10:00	16:10	EAM
SH4736-061	5	JHG23A	7/23/2014 4:14:00	16:14	EAM
SH4736-063	5	JHG23A	7/23/2014 4:17:00	16:17	EAM
SH4736-065	5	JHG23A	7/23/2014 4:21:00	16:21	EAM
SH4736-067	5	JHG23A	7/23/2014 4:24:00	16:24	EAM
CCV	1	JHG23A	7/23/2014 4:28:00	16:28	EAM
CCB	1	JHG23A	7/23/2014 4:31:00	16:31	EAM
SH4736-069	5	JHG23A	7/23/2014 4:35:00	16:35	EAM
SH4736-071	5	JHG23A	7/23/2014 4:39:00	16:39	EAM
SH5280-001	1	JHG23A	7/23/2014 4:42:00	16:42	EAM
SH5280-001L	5	JHG23A	7/23/2014 4:46:00	16:46	EAM
SH5280-001S	5	JHG23A	7/23/2014 4:49:00	16:49	EAM
SH5280-001P	5	JHG23A	7/23/2014 4:52:00	16:52	EAM
SH5282-001	5	JHG23A	7/23/2014 4:56:00	16:56	EAM
SH5282-001	25	JHG23A	7/23/2014 4:59:00	16:59	EAM
SH5283-001	1	JHG23A	7/23/2014 5:03:00	17:03	EAM
PBWHG09IMW2	5	JHG23A	7/23/2014 5:06:00	17:06	EAM
CCV	1	JHG23A	7/23/2014 5:10:00	17:10	EAM
CCB	1	JHG23A	7/23/2014 5:13:00	17:13	EAM
LCSWHG09IMW2	5	JHG23A	7/23/2014 5:17:00	17:17	EAM
SH4986-009	5	JHG23A	7/23/2014 5:20:00	17:20	EAM
SH4986-009L	25	JHG23A	7/23/2014 5:24:00	17:24	EAM
SH4986-009A	5	JHG23A	7/23/2014 5:27:00	17:27	EAM

SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
SH4986-009S	5	JHG23A	7/23/2014	5:31:00 17:31	EAM
SH4986-009P	5	JHG23A	7/23/2014	5:34:00 17:34	EAM
PBSHG15IMS1	5	JHG23A	7/23/2014	5:38:00 17:38	EAM
LCSOHG15IMS1	5	JHG23A	7/23/2014	5:41:00 17:41	EAM
SH4986-001	5	JHG23A	7/23/2014	5:45:00 17:45	EAM
SH4986-002	5	JHG23A	7/23/2014	5:48:00 17:48	EAM
CCV	1	JHG23A	7/23/2014	5:52:00 17:52	EAM
CCB	1	JHG23A	7/23/2014	5:55:00 17:55	EAM
SH4986-003	5	JHG23A	7/23/2014	5:59:00 17:59	EAM
SH4986-004	5	JHG23A	7/23/2014	6:03:00 18:03	EAM
SH4986-005	5	JHG23A	7/23/2014	6:06:00 18:06	EAM
SH4986-006	5	JHG23A	7/23/2014	6:10:00 18:10	EAM
SH4986-007	5	JHG23A	7/23/2014	6:14:00 18:14	EAM
SH4986-008	5	JHG23A	7/23/2014	6:17:00 18:17	EAM
SH4986-008L	25	JHG23A	7/23/2014	6:21:00 18:21	EAM
SH4986-008A	5	JHG23A	7/23/2014	6:24:00 18:24	EAM
SH4986-008S	5	JHG23A	7/23/2014	6:28:00 18:28	EAM
SH4986-008P	5	JHG23A	7/23/2014	6:32:00 18:32	EAM
CCV	1	JHG23A	7/23/2014	6:35:00 18:35	EAM
CCB	1	JHG23A	7/23/2014	6:38:00 18:38	EAM
PQL	1	JHG23A	7/23/2014	6:42:00 18:42	EAM
CCV	1	JHG23A	7/23/2014	6:45:00 18:45	EAM
CCB	1	JHG23A	7/23/2014	6:49:00 18:49	EAM

=== Graph Detail ===

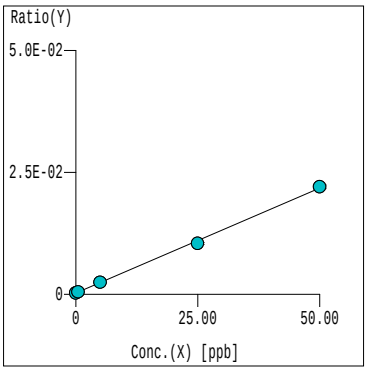
Calib. Date : 07/23/14 12:43

Step	Mass	Element	ISTD	Unit
(1)	9	Be	6	ppb



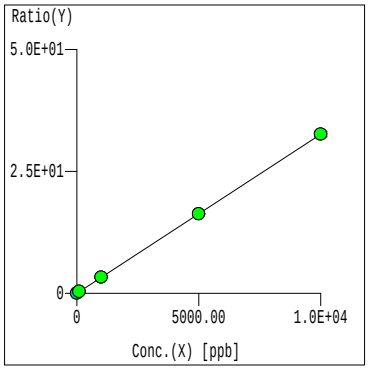
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 8.813E-004*X +1.766E-006
X = 1.135E+003*Y -2.004E-003
DL = 2.187E-03 ppb
BEC = 2.004E-03 ppb

Step	Mass	Element	ISTD	Unit
(1)	11	B	6	ppb



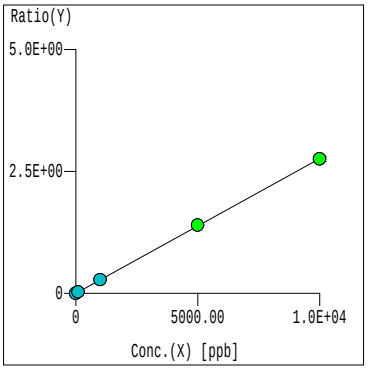
Curve Fit: Y=aX+[blank]
r = 0.9994
Y = 4.301E-004*X +2.738E-004
X = 2.325E+003*Y -6.367E-001
DL = 9.108E-02 ppb
BEC = 6.367E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	23	Na	45	ppb



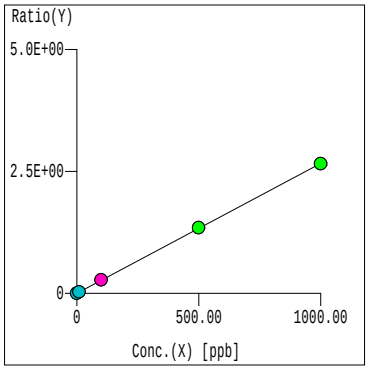
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 3.260E-003*X +3.876E-002
X = 3.068E+002*Y -1.189E+001
DL = 8.171E-01 ppb
BEC = 11.89 ppb

Step	Mass	Element	ISTD	Unit
(1)	25	Mg	45	ppb



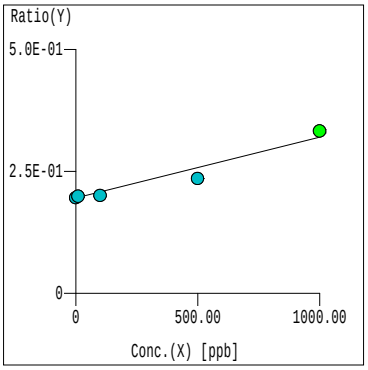
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.765E-004*X +5.058E-005
X = 3.616E+003*Y -1.829E-001
DL = 1.831E-01 ppb
BEC = 1.829E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	27	Al	45	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.662E-003*X +1.255E-003
X = 3.756E+002*Y -4.712E-001
DL = 9.895E-02 ppb
BEC = 4.712E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	29	Si	45	ppb



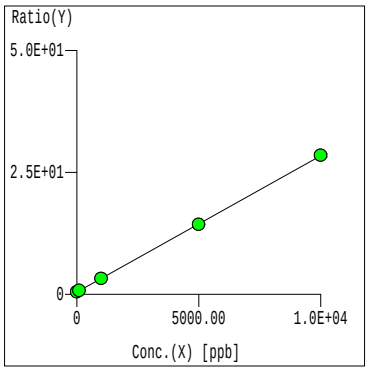
Curve Fit: Y=aX+[blank]
r = 0.9761
Y = 1.247E-004*X +1.957E-001
X = 8.017E+003*Y -1.569E+003
DL = 60.11 ppb
BEC = 1569 ppb

Katahdin Analytical Services 4000066

=== Graph Detail ===

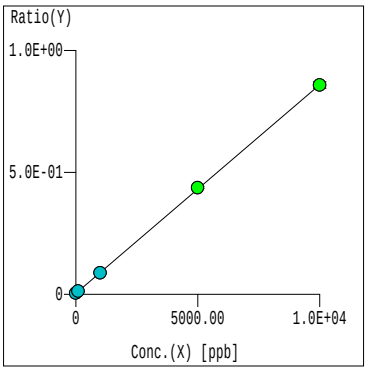
Calib. Date : 07/23/14 12:43

Step	Mass	Element	ISTD	Unit
(1)	39	K	45	ppb



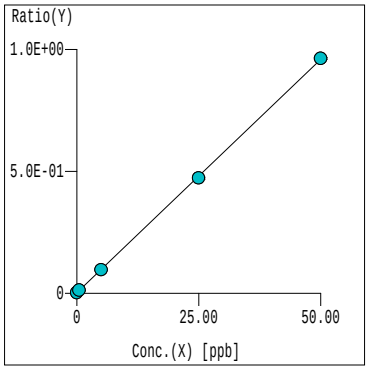
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.795E-003*X +4.925E-001
X = 3.578E+002*Y -1.762E+002
DL = 1.149 ppb
BEC = 176.2 ppb

Step	Mass	Element	ISTD	Unit
(1)	44	Ca	45	ppb



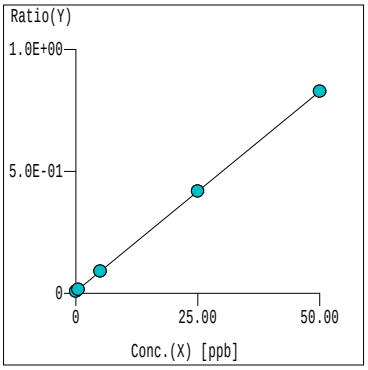
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 8.558E-005*X +4.528E-003
X = 1.169E+004*Y -5.292E+001
DL = 5.144 ppb
BEC = 52.92 ppb

Step	Mass	Element	ISTD	Unit
(1)	51	V	72	ppb



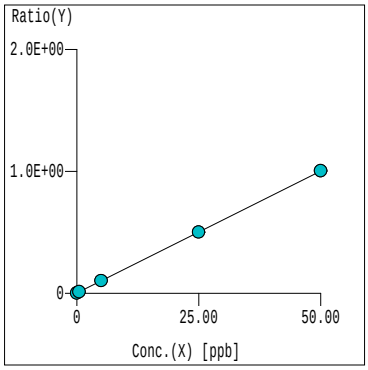
Curve Fit: Y=aX+[blank]
r = 0.9999
Y = 1.912E-002*X +2.860E-003
X = 5.229E+001*Y -1.496E-001
DL = 1.994E-01 ppb
BEC = 1.496E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	52	Cr	72	ppb



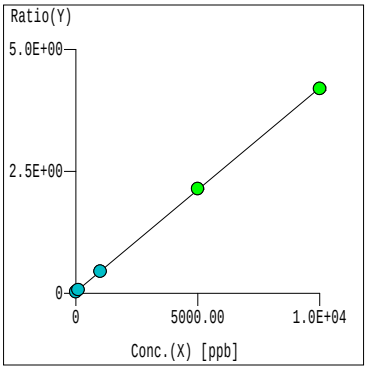
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.640E-002*X +8.682E-003
X = 6.096E+001*Y -5.292E-001
DL = 4.506E-02 ppb
BEC = 5.292E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	55	Mn	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.003E-002*X +3.024E-003
X = 4.992E+001*Y -1.510E-001
DL = 2.257E-02 ppb
BEC = 1.510E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	57	Fe	72	ppb

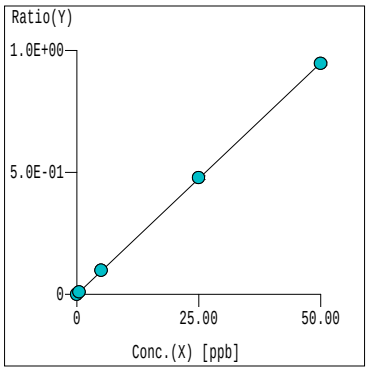


Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.178E-004*X +3.256E-002
X = 2.393E+003*Y -7.792E+001
DL = 7.564E-01 ppb
BEC = 77.92 ppb

=== Graph Detail ===

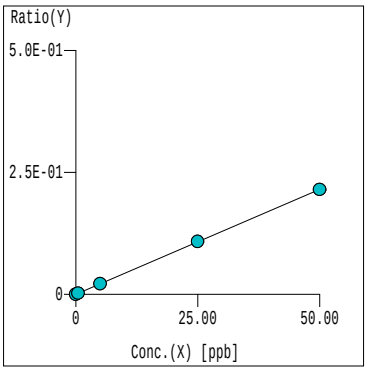
Calib. Date : 07/23/14 12:43

Step Mass Element	ISTD	Unit
(1) 59 Co	72	ppb



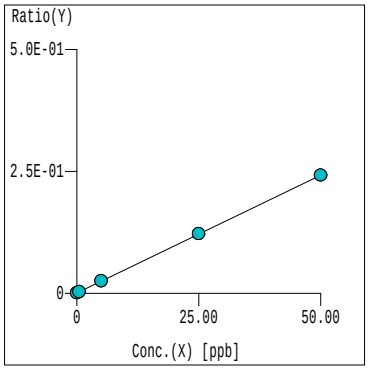
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.897E-002*X +2.491E-004
X = 5.271E+001*Y -1.313E-002
DL = 1.473E-02 ppb
BEC = 1.313E-02 ppb

Step Mass Element	ISTD	Unit
(1) 60 Ni	72	ppb



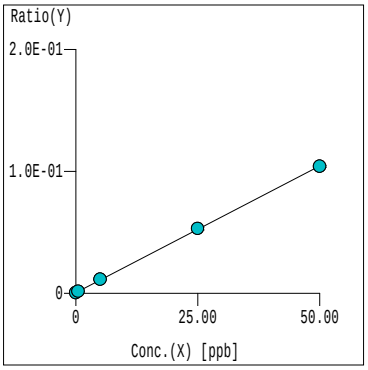
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.303E-003*X +9.823E-005
X = 2.324E+002*Y -2.283E-002
DL = 1.387E-02 ppb
BEC = 2.283E-02 ppb

Step Mass Element	ISTD	Unit
(1) 65 Cu	72	ppb



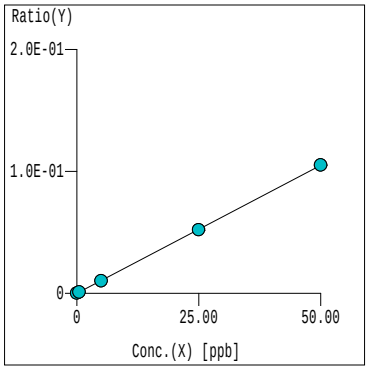
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.832E-003*X +1.035E-003
X = 2.069E+002*Y -2.141E-001
DL = 1.589E-02 ppb
BEC = 2.141E-01 ppb

Step Mass Element	ISTD	Unit
(1) 66 Zn	72	ppb



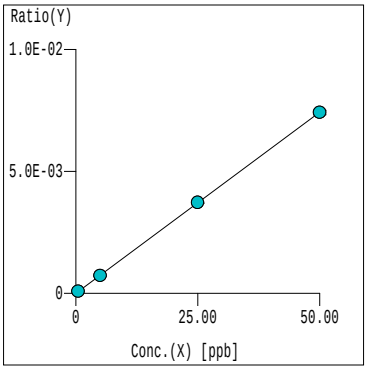
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.078E-003*X +6.137E-004
X = 4.812E+002*Y -2.953E-001
DL = 1.292E-01 ppb
BEC = 2.953E-01 ppb

Step Mass Element	ISTD	Unit
(1) 75 As	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.096E-003*X +1.578E-004
X = 4.771E+002*Y -7.528E-002
DL = 1.175E-01 ppb
BEC = 7.528E-02 ppb

Step Mass Element	ISTD	Unit
(1) 82 Se	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.485E-004*X -3.457E-006
X = 6.732E+003*Y +2.327E-002
DL = 2.996E-01 ppb
BEC = -2.327E-02 ppb

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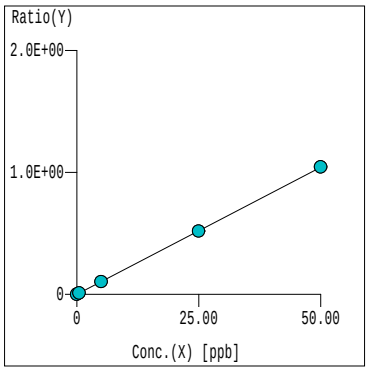
=== Graph Detail ===

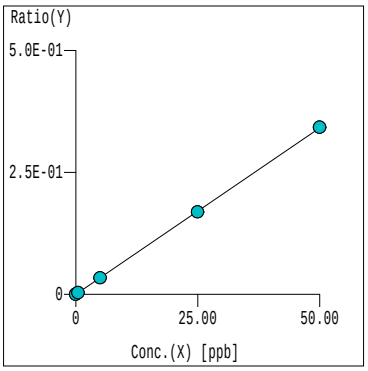
Calib. Date : 07/23/14 12:43

Step Mass Element	ISTD	Unit
(1) 88 Sr	72	ppb



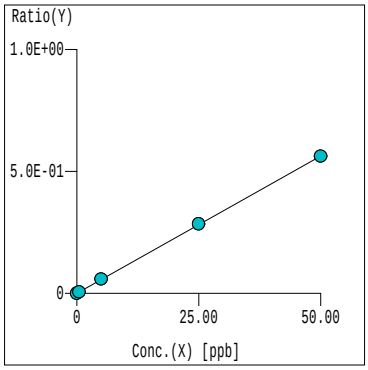
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.086E-002*X +1.776E-004
X = 4.794E+001*Y -8.515E-003
DL = 1.476E-02 ppb
BEC = 8.515E-03 ppb

Step Mass Element	ISTD	Unit
(1) 98 Mo	72	ppb



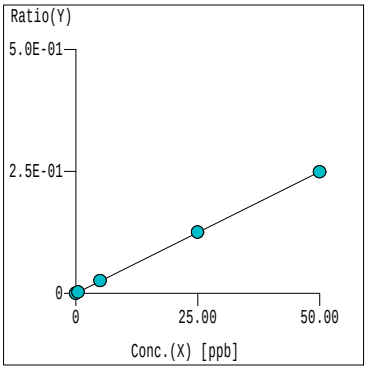
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 6.826E-003*X +8.933E-005
X = 1.465E+002*Y -1.309E-002
DL = 8.481E-03 ppb
BEC = 1.309E-02 ppb

Step Mass Element	ISTD	Unit
(1) 107 Ag	72	ppb



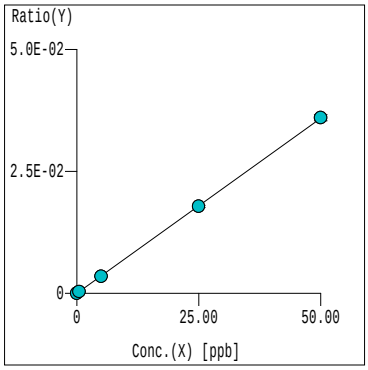
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.128E-002*X +7.291E-005
X = 8.867E+001*Y -6.465E-003
DL = 6.892E-03 ppb
BEC = 6.465E-03 ppb

Step Mass Element	ISTD	Unit
(1) 114 Cd	72	ppb



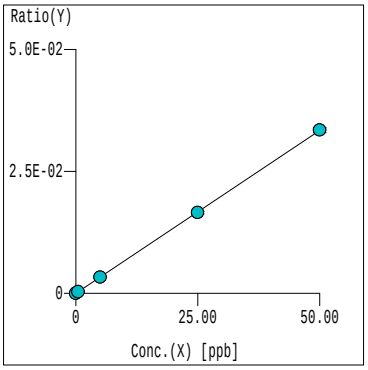
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.985E-003*X +1.334E-004
X = 2.006E+002*Y -2.675E-002
DL = 5.116E-03 ppb
BEC = 2.675E-02 ppb

Step Mass Element	ISTD	Unit
(1) 118 Sn	159	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 7.183E-004*X +1.295E-005
X = 1.392E+003*Y -1.802E-002
DL = 1.806E-02 ppb
BEC = 1.802E-02 ppb

Step Mass Element	ISTD	Unit
(1) 123 Sb	159	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 6.681E-004*X +5.675E-006
X = 1.497E+003*Y -8.494E-003
DL = 3.817E-03 ppb
BEC = 8.494E-03 ppb

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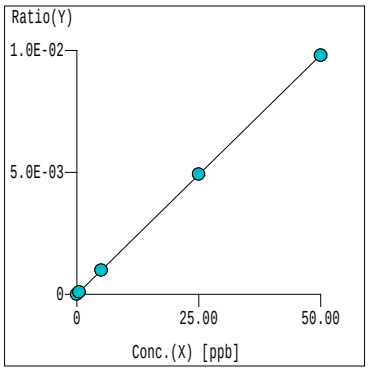
=== Graph Detail ===

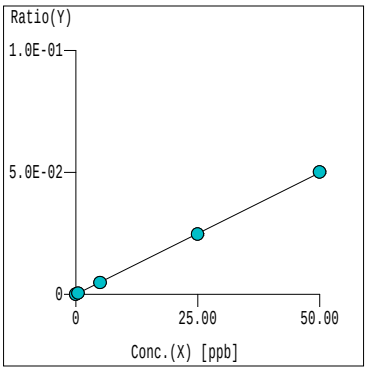
Calib. Date : 07/23/14 12:43

Step Mass Element	ISTD	Unit
(1) 135 Ba	159	ppb



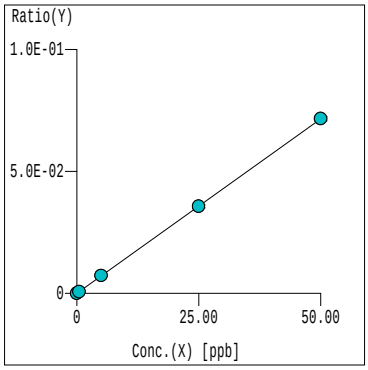
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.961E-004*X +5.088E-006
X = 5.099E+003*Y -2.594E-002
DL = 2.280E-02 ppb
BEC = 2.594E-02 ppb

Step Mass Element	ISTD	Unit
(1) 182 W	159	ppb



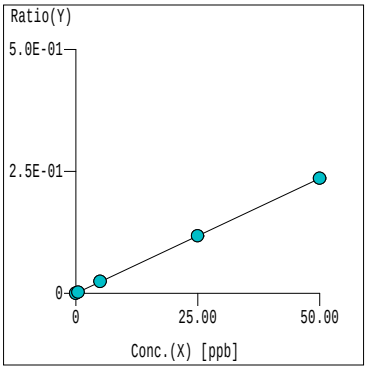
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 9.990E-004*X +1.199E-005
X = 1.001E+003*Y -1.200E-002
DL = 1.200E-02 ppb
BEC = 1.200E-02 ppb

Step Mass Element	ISTD	Unit
(1) 203 Tl	209	ppb



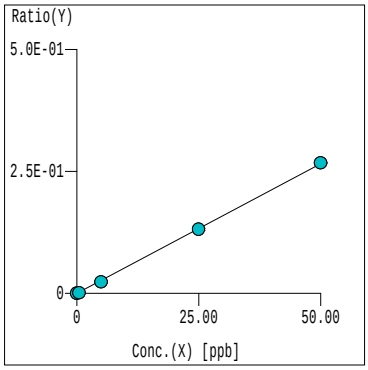
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.431E-003*X +5.770E-006
X = 6.986E+002*Y -4.031E-003
DL = 4.645E-03 ppb
BEC = 4.031E-03 ppb

Step Mass Element	ISTD	Unit
(1) 208 Pb	209	ppb



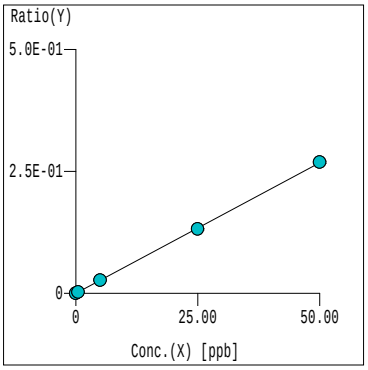
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.715E-003*X +9.990E-005
X = 2.121E+002*Y -2.119E-002
DL = 9.129E-03 ppb
BEC = 2.119E-02 ppb

Step Mass Element	ISTD	Unit
(1) 232 Th	209	ppb



Curve Fit: Y=aX+[blank]
r = 0.9999
Y = 5.324E-003*X +1.083E-005
X = 1.878E+002*Y -2.034E-003
DL = 2.672E-03 ppb
BEC = 2.034E-03 ppb

Step Mass Element	ISTD	Unit
(1) 238 U	209	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 5.359E-003*X +5.087E-006
X = 1.866E+002*Y -9.492E-004
DL = 1.032E-03 ppb
BEC = 9.492E-04 ppb

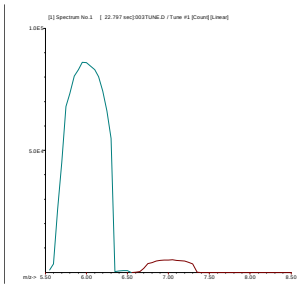
Katahdin Analytical Services 4000070

6020 QC Tune Report

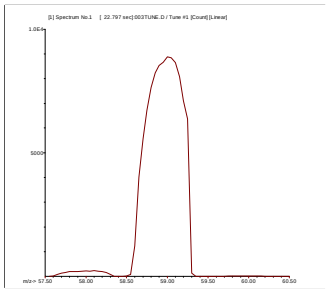
Data File: C:\ICPCHEM\1\DATA\JHG23A.B\003TUNE.D
Date Acquired: Jul 23 2014 11:57 am
Acq. Method: TN6020E.M
Operator: EAM
Sample Name: 6020 TUNE
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020E.M

RSD (%)

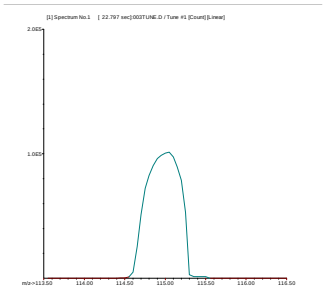
Element	Actual	Required	Flag
7 Li	1.00	5.00	
59 Co	1.00	5.00	
115 In	0.12	5.00	
205 Tl	0.80	5.00	



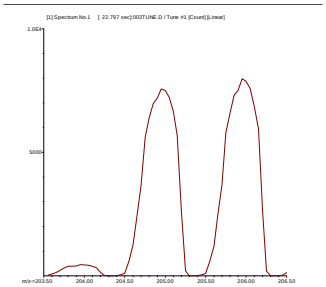
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



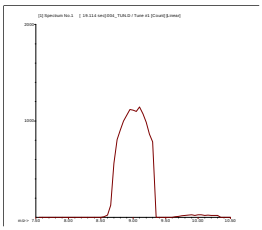
205 Tl
Mass Calib.
Actual: 204.95
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

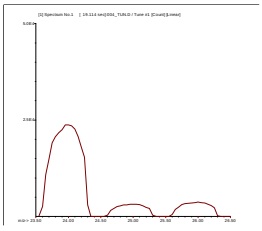
Data File: C:\ICPCHEM\1\DATA\JHG23A.B\004_TUN.D
Date Acquired: Jul 23 2014 12:00 pm
Acq. Method: TN200_8E.M
Operator: EAM
Sample Name: 200.8 TUNE
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8E.M

RSD (%)

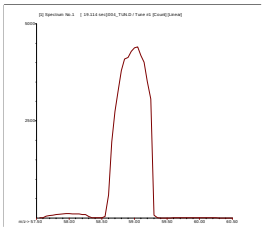
Element	Actual	Required	Flag
9 Be	2.59	5.00	
24 Mg	2.52	5.00	
59 Co	0.93	5.00	
115 In	2.04	5.00	
208 Pb	1.25	5.00	



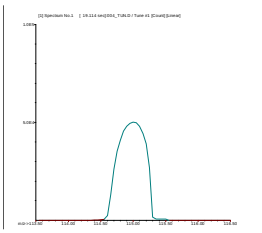
9 Be
Mass Calib.
Actual: 9.05
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



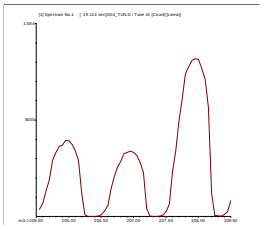
24 Mg
Mass Calib.
Actual: 24.00
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.60
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 207.95
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.60
Required: 1.00
Flag:

Tune Result: Pass

Katahdin Analytical Services 4000072

Calibration Blank QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.I
Date Acquired: Jul 23 2014 12:28 pm
Operator: EAM
Sample Name: Cal Blank
Misc Info:
Vial Number: 1203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 23 2014 12:27 pm
Sample Type: CalBlk
Total Dil Factor: 1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	3254874.00	A	81280.00	2.50
9	Be	12.96	P	2.80	21.57
11	B	2545.84	P	92.65	3.64
23	Na	82443.59	P	1686.00	2.05
25	Mg	220.02	P	6.67	3.03
27	Al	5180.88	P	637.10	12.30
28	Si	21157360.00	A	177900.00	0.84
29	Si	2619531.00	A	6854.00	0.26
39	K	2379955.00	A	13650.00	0.57
43	Ca	296.34	P	61.21	20.66
44	Ca	25073.16	P	856.20	3.41
45	Sc	2845193.00	A	56940.00	2.00
51	V	2531.86	P	709.90	28.04
52	Cr	5002.12	P	213.20	4.26
53	Cr	8266.96	P	69.35	0.84
55	Mn	4198.50	P	97.17	2.31
56	Fe	1079445.00	A	8222.00	0.76
57	Fe	32314.18	P	799.90	2.48
59	Co	526.71	P	17.64	3.35
60	Ni	175.31	P	20.07	11.45
63	Cu	952.28	P	58.92	6.19
65	Cu	378.90	P	51.25	13.53
66	Zn	523.36	P	20.28	3.88
68	Zn	3565.00	P	61.51	1.73
72	Ge	628164.81	P	13320.00	2.12
75	As	-77.94	P	104.10	133.56
82	Se	0.95	P	6.55	692.83
88	Sr	144.46	P	22.23	15.39
89	Y	4366845.00	A	89670.00	2.05
98	Mo	129.12	P	7.72	5.98
107	Ag	86.67	P	8.82	10.18
109	Ag	61.11	P	16.78	27.46
111	Cd	1174.33	P	25.33	2.16
114	Cd	75.84	P	3.05	4.03
115	In	3775797.00	A	90510.00	2.40
118	Sn	112.23	P	10.18	9.07
120	Sn	122.23	P	20.37	16.67
121	Sb	94.45	P	11.71	12.40
123	Sb	60.00	P	8.82	14.70
135	Ba	52.22	P	6.94	13.29
137	Ba	73.34	P	17.64	24.05
159	Tb	4911964.00	A	133700.00	2.72
182	W	78.89	P	10.71	13.58
203	Tl	60.00	P	6.67	11.11
205	Tl	65.56	P	23.41	35.71
208	Pb	434.54	P	111.80	25.73
209	Bi	2733047.00	A	69750.00	2.55
232	Th	51.11	P	10.18	19.92
238	U	35.56	P	10.71	30.12

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\014CALI.D\014CALI.D#
Date Acquired: Jul 23 2014 12:31 pm
Operator: EAM
Sample Name: Cal Std 1
Misc Info:
Vial Number: 1101
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 23 2014 12:30 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3187423.00	A	16320.00	0.51
9 Be	1354.15	P	43.34	3.20
11 B	3337.14	P	151.40	4.54
23 Na	1019792.00	A	5021.00	0.49
25 Mg	80377.72	P	541.70	0.67
27 Al	83898.54	P	3469.00	4.13
28 Si	20859550.00	A	588500.00	2.82
29 Si	2603264.00	A	61260.00	2.35
39 K	3185754.00	A	17930.00	0.56
43 Ca	1781.80	P	366.30	20.56
44 Ca	49658.48	P	698.00	1.41
45 Sc	2800839.00	A	1229.00	0.04
51 V	7804.38	P	340.60	4.36
52 Cr	9458.81	P	333.60	3.53
53 Cr	8883.99	P	116.20	1.31
55 Mn	10362.79	P	91.49	0.88
56 Fe	2063733.00	A	19730.00	0.96
57 Fe	56822.07	P	482.50	0.85
59 Co	5639.21	P	32.89	0.58
60 Ni	1386.38	P	62.01	4.47
63 Cu	4088.47	P	87.72	2.15
65 Cu	1878.11	P	101.90	5.43
66 Zn	1765.72	P	76.19	4.31
68 Zn	4490.83	P	190.30	4.24
72 Ge	619024.19	P	2618.00	0.42
75 As	714.96	P	162.80	22.77
82 Se	44.45	P	6.27	14.12
88 Sr	7091.41	P	269.60	3.80
89 Y	4273593.00	A	13570.00	0.32
98 Mo	2008.02	P	42.13	2.10
107 Ag	3254.93	P	44.28	1.36
109 Ag	3044.87	P	51.68	1.70
111 Cd	1845.93	P	60.42	3.27
114 Cd	1588.53	P	23.98	1.51
115 In	3702740.00	A	15000.00	0.41
118 Sn	1955.75	P	105.10	5.37
120 Sn	2743.69	P	47.27	1.72
121 Sb	2582.54	P	62.94	2.44
123 Sb	1996.88	P	72.12	3.61
135 Ba	602.26	P	18.95	3.15
137 Ba	965.62	P	62.04	6.42
159 Tb	4773498.00	A	66180.00	1.39
182 W	2346.94	P	125.50	5.35
203 Tl	1932.43	P	90.53	4.68
205 Tl	4618.73	P	101.90	2.21
208 Pb	6554.19	P	16.68	0.25
209 Bi	2688196.00	A	13140.00	0.49
232 Th	2465.89	P	569.20	23.08
238 U	6201.66	P	159.10	2.57

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3187423.30	0.51	3254874.00	97.9	79.5 - 120.4	
45 Sc	2800839.00	0.04	2845192.80	98.4	79.5 - 120.4	
72 Ge	619024.19	0.42	628164.81	98.5	79.5 - 120.4	
159 Tb	4773498.00	1.39	4911963.50	97.2	79.5 - 120.4	
209 Bi	2688196.50	0.49	2733046.80	98.4	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000074

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\015CALI.D\015CALI.D#
Date Acquired: Jul 23 2014 12:35 pm
Operator: EAM
Sample Name: Cal Std 2
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 23 2014 12:34 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3165719.00	A	44630.00	1.41
9 Be	13685.69	P	127.40	0.93
11 B	9168.53	P	176.80	1.93
23 Na	8514617.00	A	57170.00	0.67
25 Mg	765386.13	P	6700.00	0.88
27 Al	737724.69	P	7273.00	0.99
28 Si	21132660.00	A	465000.00	2.20
29 Si	2599180.00	A	7758.00	0.30
39 K	9995874.00	A	60960.00	0.61
43 Ca	14415.93	P	357.30	2.48
44 Ca	255927.41	P	1659.00	0.65
45 Sc	2781927.00	A	41290.00	1.48
51 V	57206.55	P	606.60	1.06
52 Cr	52392.17	P	743.50	1.42
53 Cr	13923.51	P	334.50	2.40
55 Mn	62916.44	P	430.90	0.68
56 Fe	10348880.00	A	53430.00	0.52
57 Fe	264254.59	P	2619.00	0.99
59 Co	53934.12	P	562.30	1.04
60 Ni	12064.92	P	191.80	1.59
63 Cu	30249.96	P	261.60	0.86
65 Cu	14170.13	P	347.10	2.45
66 Zn	7324.22	P	238.50	3.26
68 Zn	8427.09	P	294.40	3.49
72 Ge	613643.88	P	8626.00	1.41
75 As	7449.09	P	133.90	1.80
82 Se	405.67	P	7.62	1.88
88 Sr	64985.20	P	1307.00	2.01
89 Y	4279556.00	A	75790.00	1.77
98 Mo	20257.76	P	82.57	0.41
107 Ag	33611.54	P	190.70	0.57
109 Ag	31883.25	P	406.00	1.27
111 Cd	7695.33	P	137.30	1.78
114 Cd	15275.48	P	56.46	0.37
115 In	3720896.00	A	34820.00	0.94
118 Sn	18407.76	P	249.60	1.36
120 Sn	25070.09	P	226.70	0.90
121 Sb	26107.49	P	210.60	0.81
123 Sb	20084.50	P	380.20	1.89
135 Ba	5381.19	P	165.10	3.07
137 Ba	9223.26	P	190.70	2.07
159 Tb	4786002.00	A	76640.00	1.60
182 W	22341.92	P	208.70	0.93
203 Tl	19412.11	P	162.50	0.84
205 Tl	46234.51	P	369.50	0.80
208 Pb	62971.84	P	716.80	1.14
209 Bi	2695672.00	A	31920.00	1.18
232 Th	54248.25	P	3045.00	5.61
238 U	63808.49	P	400.00	0.63

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3165719.00	1.41	3254874.00	97.3	79.5 - 120.4	
45 Sc	2781927.30	1.48	2845192.80	97.8	79.5 - 120.4	
72 Ge	613643.94	1.41	628164.81	97.7	79.5 - 120.4	
159 Tb	4786002.00	1.60	4911963.50	97.4	79.5 - 120.4	
209 Bi	2695671.80	1.18	2733046.80	98.6	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000075

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\016CALI.D\016CALI.D#
Date Acquired: Jul 23 2014 12:38 pm
Operator: EAM
Sample Name: Cal Std 3
Misc Info:
Vial Number: 1103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 23 2014 12:37 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3135824.00	A	114800.00	3.66
9 Be	67066.52	P	1084.00	1.62
11 B	35645.91	P	724.40	2.03
23 Na	41567912.00	A	661600.00	1.59
25 Mg	3728554.00	A	64970.00	1.74
27 Al	3608486.00	A	44240.00	1.23
28 Si	22819730.00	A	246300.00	1.08
29 Si	2679584.00	A	9071.00	0.34
39 K	40125480.00	A	420300.00	1.05
43 Ca	70692.17	P	1631.00	2.31
44 Ca	1206419.00	A	18380.00	1.52
45 Sc	2755514.00	A	103600.00	3.76
51 V	268529.50	P	4287.00	1.60
52 Cr	235085.00	P	3316.00	1.41
53 Cr	35589.07	P	614.40	1.73
55 Mn	285924.69	P	4352.00	1.52
56 Fe	46769048.00	A	662300.00	1.42
57 Fe	1198383.00	A	24110.00	2.01
59 Co	254780.80	P	2706.00	1.06
60 Ni	57000.28	P	1347.00	2.36
63 Cu	139478.80	P	3685.00	2.64
65 Cu	65902.30	P	1235.00	1.87
66 Zn	33523.58	P	1012.00	3.02
68 Zn	27046.07	P	573.70	2.12
72 Ge	605655.69	P	23050.00	3.81
75 As	36631.24	P	594.60	1.62
82 Se	2053.66	P	36.64	1.78
88 Sr	315482.50	P	6997.00	2.22
89 Y	4220786.00	A	179700.00	4.26
98 Mo	98671.95	P	1704.00	1.73
107 Ag	160068.00	P	2286.00	1.43
109 Ag	152689.59	P	2034.00	1.33
111 Cd	32403.00	P	372.10	1.15
114 Cd	72533.58	P	1212.00	1.67
115 In	3637393.00	A	131800.00	3.62
118 Sn	89790.40	P	1636.00	1.82
120 Sn	123511.50	P	1734.00	1.40
121 Sb	126174.60	P	2675.00	1.12
123 Sb	96238.96	P	1139.00	1.18
135 Ba	25996.40	P	511.20	1.97
137 Ba	44980.20	P	712.20	1.58
159 Tb	4739127.00	A	233600.00	4.93
182 W	109702.00	P	1456.00	1.33
203 Tl	92261.21	P	1797.00	1.95
205 Tl	221645.80	P	4404.00	1.99
208 Pb	300547.91	P	4525.00	1.51
209 Bi	2663667.00	A	95150.00	3.57
232 Th	317950.59	P	5949.00	1.87
238 U	311036.81	P	5466.00	1.76

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3135823.80	3.66	3254874.00	96.3	79.5 - 120.4	
45 Sc	2755514.30	3.76	2845192.80	96.8	79.5 - 120.4	
72 Ge	605655.69	3.81	628164.81	96.4	79.5 - 120.4	
159 Tb	4739127.50	4.93	4911963.50	96.5	79.5 - 120.4	
209 Bi	2663667.00	3.57	2733046.80	97.5	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000076

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\017CALI.D\017CALI.D#
Date Acquired: Jul 23 2014 12:41 pm
Operator: EAM
Sample Name: Cal Std 4
Misc Info:
Vial Number: 1104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 23 2014 12:40 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	3082195.00	A	9422.00	0.31
9 Be	138145.50	P	822.80	0.60
11 B	70724.52	P	1215.00	1.72
23 Na	83824208.00	A	165200.00	0.20
25 Mg	7458194.00	A	42750.00	0.57
27 Al	7145514.00	A	28380.00	0.40
28 Si	24582110.00	A	181400.00	0.74
29 Si	2802250.00	A	47950.00	1.71
39 K	78340864.00	A	357800.00	0.46
43 Ca	142821.80	P	181.30	0.13
44 Ca	2342705.00	A	9231.00	0.39
45 Sc	2743067.00	A	8118.00	0.30
51 V	535470.50	P	1638.00	0.31
52 Cr	463418.09	P	1459.00	0.31
53 Cr	62769.13	P	804.00	1.28
55 Mn	566068.19	P	449.20	0.08
56 Fe	92679760.00	A	292200.00	0.32
57 Fe	2327600.00	A	6636.00	0.29
59 Co	505817.31	P	857.90	0.17
60 Ni	114460.20	P	1055.00	0.92
63 Cu	276683.69	P	837.90	0.30
65 Cu	130305.00	P	200.40	0.15
66 Zn	67358.85	P	581.90	0.86
68 Zn	51032.76	P	554.00	1.09
72 Ge	596408.81	P	4205.00	0.71
75 As	74310.95	P	296.20	0.40
82 Se	4154.42	P	33.78	0.81
88 Sr	630856.38	P	554.20	0.09
89 Y	4161363.00	A	11410.00	0.27
98 Mo	197935.50	P	1063.00	0.54
107 Ag	314717.19	P	717.20	0.23
109 Ag	300730.59	P	962.10	0.32
111 Cd	62691.50	P	195.50	0.31
114 Cd	143631.91	P	475.30	0.33
115 In	3580002.00	A	34970.00	0.98
118 Sn	178847.41	P	899.90	0.50
120 Sn	247468.91	P	714.70	0.29
121 Sb	252488.00	P	1593.00	0.63
123 Sb	192263.09	P	1005.00	0.52
135 Ba	51402.65	P	272.80	0.53
137 Ba	88609.95	P	1156.00	1.30
159 Tb	4665621.00	A	34400.00	0.74
182 W	221270.91	P	856.70	0.39
203 Tl	182262.09	P	858.60	0.47
205 Tl	438228.00	P	2916.00	0.67
208 Pb	590653.81	P	4766.00	0.81
209 Bi	2571491.00	A	6440.00	0.25
232 Th	638108.00	P	4035.00	0.63
238 U	619256.13	P	5027.00	0.81

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3082195.30	0.31	3254874.00	94.7	79.5 - 120.4	
45 Sc	2743066.80	0.30	2845192.80	96.4	79.5 - 120.4	
72 Ge	596408.81	0.71	628164.81	94.9	79.5 - 120.4	
159 Tb	4665621.00	0.74	4911963.50	95.0	79.5 - 120.4	
209 Bi	2571491.00	0.25	2733046.80	94.1	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000077

ICV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\018_ICV.D\018_ICV.D#
Date Acquired: Jul 23 2014 12:44 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICV
Misc Info:
Vial Number: 1202
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.499998 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	19.34	ppb	1.82	20	96.7	
11 B	19.08	ppb	1.19	20	95.4	
23 Na	3,991.	ppb	2.55	4,000	99.775	
25 Mg	4,056.	ppb	2.88	4,000	101.4	
27 Al	398.7	ppb	2.67	400	99.675	
28 Si	371.3	ppb	24.38	400	92.825	
29 Si	379.	ppb	42.43	400	94.75	
39 K	4,003.	ppb	3.32	4,000	100.075	
43 Ca	4,112.	ppb	3.45	4,000	102.8	
44 Ca	4,072.	ppb	2.86	4,000	101.8	
51 V	20.05	ppb	3.54	20	100.25	
52 Cr	19.6	ppb	2.99	20	98	
53 Cr	18.42	ppb	2.57	20	92.1	
55 Mn	19.85	ppb	2.50	20	99.25	
56 Fe	4,032.	ppb	2.53	4,000	100.8	
57 Fe	4,053.	ppb	3.17	4,000	101.325	
59 Co	20.11	ppb	2.57	20	100.55	
60 Ni	20.59	ppb	2.61	20	102.95	
63 Cu	19.79	ppb	2.82	20	98.95	
65 Cu	19.98	ppb	4.32	20	99.9	
66 Zn	20.22	ppb	2.19	20	101.1	
68 Zn	20.79	ppb	2.49	20	103.95	
75 As	19.98	ppb	2.36	20	99.9	
82 Se	20.04	ppb	2.55	20	100.2	
88 Sr	20.27	ppb	3.62	20	101.35	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	41.06	ppb	2.57	40	102.65	
107 Ag	20.2	ppb	2.61	20	101	
109 Ag	20.08	ppb	2.61	20	100.4	
111 Cd	19.91	ppb	2.81	20	99.55	
114 Cd	19.83	ppb	2.74	20	99.15	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	20.3	ppb	3.50	20	101.5	
120 Sn	20.23	ppb	3.21	20	101.15	
121 Sb	19.77	ppb	2.24	20	98.85	
123 Sb	19.8	ppb	3.03	20	99	
135 Ba	19.93	ppb	2.33	20	99.65	
137 Ba	20.	ppb	2.47	20	100	
182 W	19.24	ppb	2.42	20	96.2	
203 Tl	20.85	ppb	4.15	20	104.25	
205 Tl	20.78	ppb	4.03	20	103.9	
208 Pb	20.36	ppb	3.25	20	101.8	
232 Th	20.56	ppb	2.86	20	102.8	
238 U	20.27	ppb	3.06	20	101.35	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3125639.30	2.04	3254874.00	96.0	80 - 120.4	
45 Sc	2752321.00	2.60	2845192.80	96.7	80 - 120.4	
72 Ge	601637.69	2.71	628164.81	95.8	80 - 120.4	
159 Tb	4696399.50	2.41	4911963.50	95.6	80 - 120.4	
209 Bi	2615699.30	2.99	2733046.80	95.7	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000078

ICB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\019_ICB.D\019_ICB.D#
Date Acquired: Jul 23 2014 12:47 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICB
Misc Info:
Vial Number: 1203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-ICB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0076	ppb	14.47	1.00	
11 B	0.6182	ppb	24.67	1.00	
23 Na	0.6595	ppb	54.00	1.00	
25 Mg	0.1755	ppb	24.15	1.00	
27 Al	-0.0273	ppb	77.02	1.00	
28 Si	-51.96	ppb	158.41	1.00	
29 Si	63.32	ppb	400.19	1.00	
39 K	6.666	ppb	110.22	1.00	
43 Ca	0.7833	ppb	424.10	1.00	
44 Ca	2.082	ppb	255.57	1.00	
51 V	-0.0318	ppb	143.32	1.00	
52 Cr	-0.007	ppb	182.00	1.00	
53 Cr	-0.1664	ppb	195.25	1.00	
55 Mn	0.0032	ppb	228.53	1.00	
56 Fe	0.5045	ppb	696.73	1.00	
57 Fe	3.618	ppb	154.84	1.00	
59 Co	-0.0114	ppb	35.50	1.00	
60 Ni	0.004	ppb	294.82	1.00	
63 Cu	-0.0138	ppb	37.96	1.00	
65 Cu	0.0039	ppb	270.91	1.00	
66 Zn	-0.0302	ppb	160.17	1.00	
68 Zn	0.1102	ppb	199.00	1.00	
75 As	0.1065	ppb	45.75	1.00	
82 Se	0.1352	ppb	100.30	1.00	
88 Sr	0.0003	ppb	1654.60	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.1326	ppb	13.92	1.00	
107 Ag	0.0024	ppb	73.05	1.00	
109 Ag	0.0038	ppb	20.69	1.00	
111 Cd	0.0209	ppb	107.43	1.00	
114 Cd	-0.0011	ppb	236.09	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0816	ppb	31.48	1.00	
120 Sn	0.0838	ppb	20.44	1.00	
121 Sb	0.0129	ppb	28.55	1.00	
123 Sb	0.0189	ppb	29.95	1.00	
135 Ba	0.0007	ppb	2418.60	1.00	
137 Ba	0.0007	ppb	280.01	1.00	
182 W	0.1573	ppb	9.29	1.00	
203 Tl	0.0105	ppb	40.47	1.00	
205 Tl	0.0155	ppb	35.88	1.00	
208 Pb	-0.0022	ppb	70.14	1.00	
232 Th	0.0481	ppb	32.13	1.00	
238 U	0.0028	ppb	18.43	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3220388.80	2.45	3254874.00	98.9	79.5 - 120	
45 Sc	2811754.30	2.22	2845192.80	98.8	79.5 - 120	
72 Ge	614535.38	2.39	628164.81	97.8	79.5 - 120	
159 Tb	4771349.50	2.67	4911963.50	97.1	79.5 - 120	
209 Bi	2691507.80	2.11	2733046.80	98.5	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000079

PQL QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\020_PQL.D\020_PQL.D#
Date Acquired: Jul 23 2014 12:50 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PQL
Misc Info:
Vial Number: 1302
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 69.599998 - 130.4

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	0.1917	ppb	3.73	0.20	95.85	
11 B	3.758	ppb	1.50	4.00	93.95	
23 Na	209.9	ppb	1.17	200.00	104.95	
25 Mg	20.27	ppb	2.70	20.00	101.35	
27 Al	60.53	ppb	0.47	60.00	100.883	
28 Si	90.22	ppb	119.37	100.00	90.22	
29 Si	214.6	ppb	80.20	100.00	214.6	Fail
39 K	204.1	ppb	1.81	200.00	102.05	
43 Ca	25.46	ppb	26.81	20.00	127.3	
44 Ca	18.8	ppb	20.80	20.00	94	
51 V	0.9915	ppb	8.16	1.00	99.15	
52 Cr	0.9773	ppb	1.54	1.00	97.73	
53 Cr	0.8977	ppb	22.47	---	#VALUE!	
55 Mn	0.4153	ppb	4.54	0.40	103.825	
56 Fe	21.39	ppb	4.68	20.00	106.95	
57 Fe	25.99	ppb	8.41	20.00	129.95	Fail-DoD
59 Co	0.195	ppb	9.14	0.20	97.5	
60 Ni	0.4044	ppb	4.61	0.40	101.1	
63 Cu	0.582	ppb	1.86	0.60	97	
65 Cu	0.5895	ppb	3.43	0.60	98.25	
66 Zn	2.019	ppb	6.48	2.00	100.95	
68 Zn	1.896	ppb	9.40	2.00	94.8	
75 As	1.023	ppb	14.14	1.00	102.3	
82 Se	0.8465	ppb	16.16	1.00	84.65	
88 Sr	0.9843	ppb	0.69	1.00	98.43	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	1.004	ppb	4.70	1.00	100.4	
107 Ag	0.1942	ppb	1.25	0.20	97.1	
109 Ag	0.2013	ppb	5.43	0.20	100.65	
111 Cd	0.2464	ppb	12.52	0.20	123.2	
114 Cd	0.2027	ppb	3.84	0.20	101.35	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	0.9982	ppb	1.85	1.00	99.82	
120 Sn	0.9792	ppb	1.77	1.00	97.92	
121 Sb	0.2042	ppb	4.46	0.20	102.1	
123 Sb	0.2029	ppb	10.63	0.20	101.45	
135 Ba	0.4371	ppb	12.50	0.40	109.275	
137 Ba	0.3765	ppb	10.51	0.40	94.125	
182 W	1.067	ppb	3.28	1.00	106.7	
203 Tl	0.1952	ppb	2.15	0.20	97.6	
205 Tl	0.213	ppb	2.78	0.20	106.5	
208 Pb	0.2053	ppb	5.14	0.20	102.65	
232 Th	0.1872	ppb	4.58	0.20	93.6	
238 U	0.1986	ppb	0.46	0.20	99.3	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3220099.00	0.67	3254874.00	98.9	80 - 120.4	
45 Sc	2793420.00	1.09	2845192.80	98.2	80 - 120.4	
72 Ge	613265.00	0.87	628164.81	97.6	80 - 120.4	
159 Tb	4774164.50	1.10	4911963.50	97.2	80 - 120.4	
209 Bi	2689650.30	1.74	2733046.80	98.4	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000080

ICS-A QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\021ICSA.D\021ICSA.D#
Date Acquired: Jul 23 2014 12:53 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICSA
Misc Info:
Vial Number: 1204
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-ICSA
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0132	ppb	8.84		
11 B	0.4427	ppb	17.24		
23 Na	94,030.	ppb	1.09		
25 Mg	92,560.	ppb	1.20		
27 Al	92,720.	ppb	0.62		
28 Si	65.22	ppb	150.71		
29 Si	-291.5	ppb	88.71		
39 K	94,470.	ppb	0.82		
43 Ca	98,440.	ppb	1.50		
44 Ca	92,290.	ppb	0.88		
51 V	0.1102	ppb	50.45		
52 Cr	1.729	ppb	0.58		
53 Cr	1.458	ppb	12.31		
55 Mn	0.3294	ppb	9.23		
56 Fe	92,390.	ppb	0.79		
57 Fe	88,450.	ppb	0.67		
59 Co	0.084	ppb	20.95		
60 Ni	-0.0928	ppb	18.38		
63 Cu	1.505	ppb	3.50		
65 Cu	0.9266	ppb	2.97		
66 Zn	1.714	ppb	2.05		
68 Zn	0.8106	ppb	23.00		
75 As	0.1675	ppb	59.70		
82 Se	0.0973	ppb	57.92		
88 Sr	0.609	ppb	2.50		
89 Y	--------	---	--------		
98 Mo	1,859.	ppb	0.83		
107 Ag	0.0112	ppb	44.16		
109 Ag	0.0146	ppb	39.68		
111 Cd	0.0323	ppb	139.54		
114 Cd	0.1368	ppb	18.14		
115 In	--------	---	--------		
118 Sn	0.0629	ppb	23.03		
120 Sn	0.0545	ppb	20.18		
121 Sb	0.0443	ppb	6.32		
123 Sb	0.0459	ppb	8.38		
135 Ba	0.0942	ppb	18.57		
137 Ba	0.0843	ppb	17.89		
182 W	0.1811	ppb	6.73		
203 Tl	0.0032	ppb	105.06		
205 Tl	0.0053	ppb	16.30		
208 Pb	0.1966	ppb	2.53		
232 Th	0.1107	ppb	34.16		
238 U	0.0039	ppb	23.50		

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2988476.50	1.68	3254874.00	91.8	69.5 - 130.4	
45 Sc	2715190.50	1.69	2845192.80	95.4	69.5 - 130.4	
72 Ge	607381.69	1.54	628164.81	96.7	69.5 - 130.4	
159 Tb	4644978.00	0.79	4911963.50	94.6	69.5 - 130.4	
209 Bi	2437771.80	1.24	2733046.80	89.2	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000081

ICS-AB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\022ICSB.D\022ICSB.D#
Date Acquired: Jul 23 2014 12:57 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICSAB
Misc Info:
Vial Number: 1205
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-ICSAB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	Expected	QC Range(%)	Flag
9 Be	19.5	ppb	1.59	20.00	79.5 - 120	
11 B	18.62	ppb	2.39	20.00	79.5 - 120	
23 Na	93,230.	ppb	1.76	#########	79.5 - 120	
25 Mg	92,310.	ppb	1.69	#########	79.5 - 120	
27 Al	92,400.	ppb	1.35	#########	79.5 - 120	
28 Si	469.6	ppb	32.56	---	##### - #####	
29 Si	-252.1	ppb	76.24	---	##### - #####	
39 K	94,280.	ppb	1.17	#########	79.5 - 120	
43 Ca	98,090.	ppb	1.40	#########	79.5 - 120	
44 Ca	92,350.	ppb	1.65	#########	79.5 - 120	
51 V	19.6	ppb	1.82	20.00	79.5 - 120	
52 Cr	20.84	ppb	1.83	20.00	79.5 - 120	
53 Cr	20.27	ppb	0.69	---	##### - #####	
55 Mn	19.18	ppb	0.61	20.00	79.5 - 120	
56 Fe	92,450.	ppb	1.44	#########	79.5 - 120	
57 Fe	88,800.	ppb	1.46	#########	79.5 - 120	
59 Co	19.04	ppb	1.66	20.00	79.5 - 120	
60 Ni	18.23	ppb	1.27	20.00	79.5 - 120	
63 Cu	19.98	ppb	1.28	20.00	79.5 - 120	
65 Cu	19.53	ppb	0.75	20.00	79.5 - 120	
66 Zn	20.18	ppb	1.25	20.00	79.5 - 120	
68 Zn	19.07	ppb	1.94	20.00	79.5 - 120	
75 As	19.69	ppb	2.22	20.00	79.5 - 120	
82 Se	19.53	ppb	1.13	20.00	79.5 - 120	
88 Sr	19.06	ppb	0.98	20.00	79.5 - 120	
89 Y	--------	---	--------	---	##### - #####	
98 Mo	1,899.	ppb	1.81	2000.00	79.5 - 120	
107 Ag	18.66	ppb	1.82	20.00	79.5 - 120	
109 Ag	18.54	ppb	1.83	20.00	79.5 - 120	
111 Cd	18.99	ppb	2.13	20.00	79.5 - 120	
114 Cd	19.09	ppb	1.23	20.00	79.5 - 120	
115 In	--------	---	--------	---	##### - #####	
118 Sn	19.	ppb	1.53	20.00	79.5 - 120	
120 Sn	18.81	ppb	1.88	20.00	79.5 - 120	
121 Sb	19.79	ppb	2.32	20.00	79.5 - 120	
123 Sb	19.9	ppb	2.14	20.00	79.5 - 120	
135 Ba	19.42	ppb	1.38	20.00	79.5 - 120	
137 Ba	19.79	ppb	1.61	20.00	79.5 - 120	
182 W	20.53	ppb	1.74	20.00	79.5 - 120	
203 Tl	20.16	ppb	1.38	20.00	79.5 - 120	
205 Tl	20.42	ppb	1.34	20.00	79.5 - 120	
208 Pb	20.53	ppb	0.78	20.00	79.5 - 120	
232 Th	21.15	ppb	2.18	20.00	79.5 - 120	
238 U	20.99	ppb	1.48	20.00	79.5 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3023127.50	1.49	3254874.00	92.9	69.5 - 130	
45 Sc	2765379.80	1.81	2845192.80	97.2	69.5 - 130	
72 Ge	620422.75	1.44	628164.81	98.8	69.5 - 130	
159 Tb	4843604.50	1.55	4911963.50	98.6	69.5 - 130	
209 Bi	2540058.50	1.41	2733046.80	92.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000082

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\023SMPL.D\023SMPL.D#
Date Acquired: Jul 23 2014 01:00 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: Blank
Misc Info:
Vial Number: 1301
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0043	0.0043	ppb	74.34	100.	
11 B	0.3047	0.3047	ppb	18.93	1000.	
23 Na	24.5	24.5	ppb	13.82	200000.	
25 Mg	13.7	13.7	ppb	8.80	200000.	
27 Al	12.22	12.22	ppb	9.82	200000.	
28 Si	-70.89	-70.89	ppb	129.82	#VALUE!	
29 Si	-530.3	-530.3	ppb	26.74	10000.	LOW
39 K	3.279	3.279	ppb	134.52	200000.	
43 Ca	13.18	13.18	ppb	28.86	#VALUE!	
44 Ca	15.79	15.79	ppb	16.18	200000.	
51 V	-0.0387	-0.0387	ppb	43.20	1000.	
52 Cr	-0.041	-0.041	ppb	35.93	1000.	
53 Cr	-0.293	-0.293	ppb	13.28	#VALUE!	
55 Mn	-0.0459	-0.0459	ppb	27.30	1000.	
56 Fe	10.43	10.43	ppb	21.80	#VALUE!	
57 Fe	-4.246	-4.246	ppb	59.02	100000.	
59 Co	-0.0112	-0.0112	ppb	74.30	1000.	
60 Ni	-0.004	-0.004	ppb	173.06	1000.	
63 Cu	0.0608	0.0608	ppb	9.08	#VALUE!	
65 Cu	0.0587	0.0587	ppb	33.02	1000.	
66 Zn	0.0718	0.0718	ppb	23.65	1000.	
68 Zn	-0.2639	-0.2639	ppb	64.00	#VALUE!	
75 As	0.0701	0.0701	ppb	45.28	1000.	
82 Se	-0.0245	-0.0245	ppb	186.42	1000.	
88 Sr	0.0011	0.0011	ppb	98.20	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	1.829	1.829	ppb	14.86	1000.	
107 Ag	-0.0005	-0.0005	ppb	218.10	500.	
109 Ag	-0.0016	-0.0016	ppb	71.68	#VALUE!	
111 Cd	-0.141	-0.141	ppb	17.69	#VALUE!	
114 Cd	0.0109	0.0109	ppb	48.23	1000.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	0.015	0.015	ppb	27.81	1000.	
120 Sn	0.017	0.017	ppb	15.36	#VALUE!	
121 Sb	0.0021	0.0021	ppb	164.58	#VALUE!	
123 Sb	0.0121	0.0121	ppb	79.42	1000.	
135 Ba	-0.0027	-0.0027	ppb	499.25	1000.	
137 Ba	0.0006	0.0006	ppb	2938.00	#VALUE!	
182 W	0.0331	0.0331	ppb	---	#VALUE!	
203 Tl	0.003	0.003	ppb	70.97	1000.	
205 Tl	0.0079	0.0079	ppb	31.26	#VALUE!	
208 Pb	-0.0016	-0.0016	ppb	87.53	1000.	
232 Th	0.0249	0.0249	ppb	10.38	1000.	
238 U	0.0012	0.0012	ppb	96.01	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3249541.30	1.74	3254874.00	99.8	69.5 - 130	
45 Sc	2879792.00	1.25	2845192.80	101.2	69.5 - 130	
72 Ge	645266.75	1.07	628164.81	102.7	69.5 - 130	
159 Tb	5208966.50	0.78	4911963.50	106.0	69.5 - 130	
209 Bi	2923850.00	0.72	2733046.80	107.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000083

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\024_CCV.D\024_CCV.D#
Date Acquired: Jul 23 2014 01:04 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.36	ppb	0.39	25	93.44	
11 B	23.74	ppb	0.75	25	94.96	
23 Na	4,855.	ppb	0.71	5,000	97.1	
25 Mg	4,871.	ppb	0.63	5,000	97.42	
27 Al	489.7	ppb	0.55	500	97.94	
28 Si	297.2	ppb	17.24	500	59.44	
29 Si	-124.7	ppb	77.66	500	-24.94	Fail
39 K	4,862.	ppb	0.41	5,000	97.24	
43 Ca	4,899.	ppb	0.46	5,000	97.98	
44 Ca	5,001.	ppb	0.30	5,000	100.02	
51 V	23.9	ppb	0.92	25	95.6	
52 Cr	24.1	ppb	0.10	25	96.4	
53 Cr	23.74	ppb	1.61	25	94.96	
55 Mn	24.08	ppb	0.99	25	96.32	
56 Fe	4,854.	ppb	1.61	5,000	97.08	
57 Fe	4,952.	ppb	1.61	5,000	99.04	
59 Co	24.17	ppb	0.32	25	96.68	
60 Ni	24.	ppb	0.92	25	96	
63 Cu	24.14	ppb	1.35	25	96.56	
65 Cu	24.39	ppb	0.43	25	97.56	
66 Zn	24.51	ppb	1.65	25	98.04	
68 Zn	23.6	ppb	0.46	25	94.4	
75 As	24.05	ppb	1.18	25	96.2	
82 Se	24.17	ppb	2.53	25	96.68	
88 Sr	24.52	ppb	1.54	25	98.08	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.07	ppb	1.08	25	100.28	
107 Ag	24.97	ppb	0.28	25	99.88	
109 Ag	24.75	ppb	0.71	25	99	
111 Cd	24.77	ppb	1.34	25	99.08	
114 Cd	24.98	ppb	0.91	25	99.92	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.35	ppb	0.66	25	97.4	
120 Sn	24.23	ppb	1.13	25	96.92	
121 Sb	24.	ppb	0.36	25	96	
123 Sb	24.17	ppb	0.56	25	96.68	
135 Ba	24.34	ppb	0.22	25	97.36	
137 Ba	24.28	ppb	0.58	25	97.12	
182 W	24.26	ppb	1.18	25	97.04	
203 Tl	24.22	ppb	0.51	25	96.88	
205 Tl	24.39	ppb	0.86	25	97.56	
208 Pb	24.37	ppb	0.37	25	97.48	
232 Th	24.01	ppb	0.68	25	96.04	
238 U	24.12	ppb	0.87	25	96.48	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3236585.50	0.62	3254874.00	99.4	80 - 120.4	
45 Sc	2897878.00	0.68	2845192.80	101.9	80 - 120.4	
72 Ge	645365.63	1.11	628164.81	102.7	80 - 120.4	
159 Tb	5215932.00	0.66	4911963.50	106.2	80 - 120.4	
209 Bi	2889824.00	1.01	2733046.80	105.7	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000084

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\025_CCB.D\025_CCB.D#
Date Acquired: Jul 23 2014 01:07 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0043	ppb	42.22	1.00	
11 B	0.3875	ppb	18.30	1.00	
23 Na	5.73	ppb	4.84	1.00	
25 Mg	2.128	ppb	5.02	1.00	
27 Al	0.5062	ppb	26.83	1.00	
28 Si	48.3	ppb	55.74	1.00	
29 Si	-218.4	ppb	54.49	1.00	
39 K	-6.043	ppb	156.74	1.00	
43 Ca	-0.452	ppb	995.58	1.00	
44 Ca	0.5931	ppb	96.90	1.00	
51 V	-0.0161	ppb	372.43	1.00	
52 Cr	-0.0194	ppb	80.64	1.00	
53 Cr	0.2379	ppb	67.00	1.00	
55 Mn	-0.0271	ppb	24.47	1.00	
56 Fe	1.893	ppb	101.16	1.00	
57 Fe	-12.79	ppb	15.19	1.00	
59 Co	-0.0171	ppb	10.41	1.00	
60 Ni	-0.0027	ppb	238.25	1.00	
63 Cu	-0.0008	ppb	1601.60	1.00	
65 Cu	0.009	ppb	173.02	1.00	
66 Zn	-0.0399	ppb	122.40	1.00	
68 Zn	-0.4062	ppb	33.01	1.00	
75 As	0.0368	ppb	436.68	1.00	
82 Se	-0.1752	ppb	102.57	1.00	
88 Sr	0.0026	ppb	155.53	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.3305	ppb	10.02	1.00	
107 Ag	-0.0022	ppb	66.64	1.00	
109 Ag	-0.0011	ppb	226.85	1.00	
111 Cd	-0.1058	ppb	26.47	1.00	
114 Cd	0.0007	ppb	537.60	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0653	ppb	27.53	1.00	
120 Sn	0.0645	ppb	27.92	1.00	
121 Sb	0.011	ppb	33.90	1.00	
123 Sb	0.0129	ppb	99.77	1.00	
135 Ba	-0.0092	ppb	140.66	1.00	
137 Ba	-0.0025	ppb	366.85	1.00	
182 W	0.1095	ppb	9.54	1.00	
203 Tl	0.0046	ppb	7.75	1.00	
205 Tl	0.011	ppb	37.08	1.00	
208 Pb	0.002	ppb	734.15	1.00	
232 Th	0.0399	ppb	27.87	1.00	
238 U	0.0028	ppb	17.95	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3301461.30	0.71	3254874.00	101.4	79.5 - 120	
45 Sc	2882800.50	0.97	2845192.80	101.3	79.5 - 120	
72 Ge	647052.38	0.80	628164.81	103.0	79.5 - 120	
159 Tb	5172569.00	0.56	4911963.50	105.3	79.5 - 120	
209 Bi	2891359.80	0.75	2733046.80	105.8	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000085

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\026SMPL.D\026SMPL.D#
Date Acquired: Jul 23 2014 01:10 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5482-001
Misc Info:
Vial Number: 2101
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.1212	0.1212	ppb	4.36	100.	
11 B	4.919	4.919	ppb	3.91	1000.	
23 Na	36,000.	36,000.	ppb	0.48	200000.	
25 Mg	956.4	956.4	ppb	0.15	200000.	
27 Al	30.02	30.02	ppb	2.89	200000.	
28 Si	3,653.	3,653.	ppb	0.61	#VALUE!	
29 Si	2,734.	2,734.	ppb	3.34	10000.	
39 K	821.1	821.1	ppb	0.65	200000.	
43 Ca	4,543.	4,543.	ppb	2.40	#VALUE!	
44 Ca	4,580.	4,580.	ppb	1.62	200000.	
51 V	0.4546	0.4546	ppb	19.20	1000.	
52 Cr	1.553	1.553	ppb	6.32	1000.	
53 Cr	0.1428	0.1428	ppb	181.79	#VALUE!	
55 Mn	214.	214.	ppb	0.74	1000.	
56 Fe	5.225	5.225	ppb	31.60	#VALUE!	
57 Fe	-4.12	-4.12	ppb	44.90	100000.	
59 Co	-0.0003	-0.0003	ppb	976.61	1000.	
60 Ni	0.2308	0.2308	ppb	5.14	1000.	
63 Cu	87.23	87.23	ppb	0.82	#VALUE!	
65 Cu	87.52	87.52	ppb	0.78	1000.	
66 Zn	10.04	10.04	ppb	0.50	1000.	
68 Zn	9.685	9.685	ppb	0.58	#VALUE!	
75 As	0.2444	0.2444	ppb	45.25	1000.	
82 Se	0.0531	0.0531	ppb	519.40	1000.	
88 Sr	45.48	45.48	ppb	1.41	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.2749	0.2749	ppb	7.55	1000.	
107 Ag	-0.0023	-0.0023	ppb	106.91	500.	
109 Ag	-0.0001	-0.0001	ppb	2028.00	#VALUE!	
111 Cd	0.0138	0.0138	ppb	237.66	#VALUE!	
114 Cd	0.1583	0.1583	ppb	6.24	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0406	0.0406	ppb	13.17	1000.	
120 Sn	0.0494	0.0494	ppb	10.70	#VALUE!	
121 Sb	0.0219	0.0219	ppb	34.77	#VALUE!	
123 Sb	0.0223	0.0223	ppb	22.39	1000.	
135 Ba	5.894	5.894	ppb	0.91	1000.	
137 Ba	5.962	5.962	ppb	2.16	#VALUE!	
182 W	0.0547	0.0547	ppb ---		#VALUE!	
203 Tl	0.0079	0.0079	ppb	57.26	1000.	
205 Tl	0.0126	0.0126	ppb	21.57	#VALUE!	
208 Pb	0.5005	0.5005	ppb	1.55	1000.	
232 Th	0.287	0.287	ppb	53.62	1000.	
238 U	0.0961	0.0961	ppb	6.75	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3144372.00	0.91	3254874.00	96.6	69.5 - 130	
45 Sc	2781025.50	0.72	2845192.80	97.7	69.5 - 130	
72 Ge	635017.56	0.42	628164.81	101.1	69.5 - 130	
159 Tb	5086209.50	0.67	4911963.50	103.5	69.5 - 130	
209 Bi	2818840.30	0.80	2733046.80	103.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000086

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\027SMPL.D\027SMPL.D#
Date Acquired: Jul 23 2014 01:13 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5407-001
Misc Info:
Vial Number: 2102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0102	0.0102	ppb	64.28	100.	
11 B	10.09	10.09	ppb	4.84	1000.	
23 Na	90,080.	90,080.	ppb	3.16	200000.	
25 Mg	22.19	22.19	ppb	52.46	200000.	
27 Al	24.34	24.34	ppb	43.67	200000.	
28 Si	5,452.	5,452.	ppb	4.06	#VALUE!	
29 Si	4,030.	4,030.	ppb	8.63	10000.	
39 K	53.66	53.66	ppb	37.59	200000.	
43 Ca	152.3	152.3	ppb	15.04	#VALUE!	
44 Ca	186.8	186.8	ppb	8.56	200000.	
51 V	0.4817	0.4817	ppb	16.36	1000.	
52 Cr	1.488	1.488	ppb	5.13	1000.	
53 Cr	0.2702	0.2702	ppb	164.10	#VALUE!	
55 Mn	0.7996	0.7996	ppb	4.65	1000.	
56 Fe	171.	171.	ppb	10.76	#VALUE!	
57 Fe	148.3	148.3	ppb	13.18	100000.	
59 Co	-0.0021	-0.0021	ppb	135.49	1000.	
60 Ni	0.3127	0.3127	ppb	9.04	1000.	
63 Cu	4.168	4.168	ppb	3.91	#VALUE!	
65 Cu	3.452	3.452	ppb	4.32	1000.	
66 Zn	12.28	12.28	ppb	3.33	1000.	
68 Zn	11.53	11.53	ppb	1.99	#VALUE!	
75 As	0.4852	0.4852	ppb	22.05	1000.	
82 Se	-0.0135	-0.0135	ppb	590.98	1000.	
88 Sr	0.9358	0.9358	ppb	5.08	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.755	0.755	ppb	27.56	1000.	
107 Ag	0.0029	0.0029	ppb	125.51	500.	
109 Ag	0.0033	0.0033	ppb	137.74	#VALUE!	
111 Cd	-0.0075	-0.0075	ppb	242.69	#VALUE!	
114 Cd	0.1607	0.1607	ppb	1.28	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0417	0.0417	ppb	41.56	1000.	
120 Sn	0.0314	0.0314	ppb	11.06	#VALUE!	
121 Sb	0.0144	0.0144	ppb	16.75	#VALUE!	
123 Sb	0.0149	0.0149	ppb	34.79	1000.	
135 Ba	0.3196	0.3196	ppb	15.93	1000.	
137 Ba	0.2732	0.2732	ppb	12.40	#VALUE!	
182 W	0.0258	0.0258	ppb ---		#VALUE!	
203 Tl	0.0041	0.0041	ppb	142.68	1000.	
205 Tl	0.0064	0.0064	ppb	56.62	#VALUE!	
208 Pb	16.76	16.76	ppb	3.10	1000.	
232 Th	0.0129	0.0129	ppb	21.75	1000.	
238 U	0.7186	0.7186	ppb	9.55	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3088428.30	2.80	3254874.00	94.9	69.5 - 130	
45 Sc	2818395.80	2.43	2845192.80	99.1	69.5 - 130	
72 Ge	634764.44	2.84	628164.81	101.1	69.5 - 130	
159 Tb	5052651.00	2.30	4911963.50	102.9	69.5 - 130	
209 Bi	2762630.00	2.53	2733046.80	101.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000087

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\028SMPL.D\028SMPL.D#
Date Acquired: Jul 23 2014 01:17 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5408-001
Misc Info:
Vial Number: 2103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0067	0.0067	ppb	38.37	100.	
11 B	402.3	402.3	ppb	4.24	1000.	
23 Na	85,790.	85,790.	ppb	3.02	200000.	
25 Mg	8,200.	8,200.	ppb	2.99	200000.	
27 Al	10.68	10.68	ppb	3.44	200000.	
28 Si	3,803.	3,803.	ppb	7.99	#VALUE!	
29 Si	2,948.	2,948.	ppb	13.36	10000.	
39 K	842.6	842.6	ppb	4.18	200000.	
43 Ca	22,870.	22,870.	ppb	3.26	#VALUE!	
44 Ca	20,560.	20,560.	ppb	3.49	200000.	
51 V	0.8407	0.8407	ppb	4.91	1000.	
52 Cr	2.914	2.914	ppb	4.47	1000.	
53 Cr	-0.0915	-0.0915	ppb	254.12	#VALUE!	
55 Mn	51.01	51.01	ppb	3.86	1000.	
56 Fe	120.	120.	ppb	7.16	#VALUE!	
57 Fe	130.2	130.2	ppb	6.11	100000.	
59 Co	0.1474	0.1474	ppb	5.90	1000.	
60 Ni	1.984	1.984	ppb	7.77	1000.	
63 Cu	5.403	5.403	ppb	2.72	#VALUE!	
65 Cu	4.705	4.705	ppb	5.52	1000.	
66 Zn	16.17	16.17	ppb	2.59	1000.	
68 Zn	17.17	17.17	ppb	3.55	#VALUE!	
75 As	2.434	2.434	ppb	1.26	1000.	
82 Se	0.0169	0.0169	ppb	282.44	1000.	
88 Sr	1,289.	1,289.	ppb	4.10	1000.	>LDR
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.347	1.347	ppb	5.13	1000.	
107 Ag	-0.001	-0.001	ppb	190.90	500.	
109 Ag	-0.0001	-0.0001	ppb	4144.60	#VALUE!	
111 Cd	-0.0465	-0.0465	ppb	64.22	#VALUE!	
114 Cd	0.1264	0.1264	ppb	8.55	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0351	0.0351	ppb	3.48	1000.	
120 Sn	0.0434	0.0434	ppb	6.55	#VALUE!	
121 Sb	0.5975	0.5975	ppb	5.42	#VALUE!	
123 Sb	0.6118	0.6118	ppb	3.77	1000.	
135 Ba	78.52	78.52	ppb	3.61	1000.	
137 Ba	79.02	79.02	ppb	4.13	#VALUE!	
182 W	0.1147	0.1147	ppb ---		#VALUE!	
203 Tl	0.0003	0.0003	ppb	1837.50	1000.	
205 Tl	0.0021	0.0021	ppb	52.30	#VALUE!	
208 Pb	13.48	13.48	ppb	3.59	1000.	
232 Th	0.0081	0.0081	ppb	24.96	1000.	
238 U	0.703	0.703	ppb	3.95	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3110254.00	3.21	3254874.00	95.6	69.5 - 130	
45 Sc	2775342.00	2.66	2845192.80	97.5	69.5 - 130	
72 Ge	626599.13	3.13	628164.81	99.8	69.5 - 130	
159 Tb	4983029.50	3.87	4911963.50	101.4	69.5 - 130	
209 Bi	2716421.80	3.09	2733046.80	99.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000088

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\029SMPL.D\029SMPL.D#
Date Acquired: Jul 23 2014 01:20 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5409-001
Misc Info:
Vial Number: 2104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0582	0.0582	ppb	7.49	100.	
11 B	7.737	7.737	ppb	13.44	1000.	
23 Na	72,210.	72,210.	ppb	3.33	200000.	
25 Mg	2,518.	2,518.	ppb	3.28	200000.	
27 Al	4.131	4.131	ppb	2.87	200000.	
28 Si	2,841.	2,841.	ppb	6.65	#VALUE!	
29 Si	2,069.	2,069.	ppb	20.36	10000.	
39 K	1,873.	1,873.	ppb	3.65	200000.	
43 Ca	28,400.	28,400.	ppb	2.43	#VALUE!	
44 Ca	27,180.	27,180.	ppb	2.80	200000.	
51 V	0.0076	0.0076	ppb	822.57	1000.	
52 Cr	0.2717	0.2717	ppb	19.76	1000.	
53 Cr	0.0223	0.0223	ppb	511.44	#VALUE!	
55 Mn	6.052	6.052	ppb	3.72	1000.	
56 Fe	29.75	29.75	ppb	10.88	#VALUE!	
57 Fe	62.95	62.95	ppb	1.87	100000.	
59 Co	0.0211	0.0211	ppb	39.76	1000.	
60 Ni	1.044	1.044	ppb	4.96	1000.	
63 Cu	8.548	8.548	ppb	2.86	#VALUE!	
65 Cu	7.889	7.889	ppb	4.18	1000.	
66 Zn	258.2	258.2	ppb	3.60	1000.	
68 Zn	253.	253.	ppb	3.40	#VALUE!	
75 As	0.2319	0.2319	ppb	72.79	1000.	
82 Se	0.0551	0.0551	ppb	317.49	1000.	
88 Sr	211.1	211.1	ppb	3.04	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.0653	0.0653	ppb	26.73	1000.	
107 Ag	0.0073	0.0073	ppb	90.73	500.	
109 Ag	0.0072	0.0072	ppb	33.06	#VALUE!	
111 Cd	0.1528	0.1528	ppb	12.83	#VALUE!	
114 Cd	0.2039	0.2039	ppb	3.12	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0142	0.0142	ppb	44.91	1000.	
120 Sn	0.0178	0.0178	ppb	56.26	#VALUE!	
121 Sb	0.0225	0.0225	ppb	2.87	#VALUE!	
123 Sb	0.0221	0.0221	ppb	44.11	1000.	
135 Ba	26.73	26.73	ppb	3.10	1000.	
137 Ba	26.79	26.79	ppb	3.29	#VALUE!	
182 W	0.0133	0.0133	ppb ---		#VALUE!	
203 Tl	0.016	0.016	ppb	38.44	1000.	
205 Tl	0.0183	0.0183	ppb	37.07	#VALUE!	
208 Pb	3.017	3.017	ppb	4.43	1000.	
232 Th	0.004	0.004	ppb	11.77	1000.	
238 U	0.2536	0.2536	ppb	5.90	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3098987.50	2.64	3254874.00	95.2	69.5 - 130	
45 Sc	2801938.30	2.28	2845192.80	98.5	69.5 - 130	
72 Ge	623260.69	2.40	628164.81	99.2	69.5 - 130	
159 Tb	5028455.00	2.65	4911963.50	102.4	69.5 - 130	
209 Bi	2763529.30	2.64	2733046.80	101.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000089

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\030SMPL.D\030SMPL.D#
Date Acquired: Jul 23 2014 01:23 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5194-001
Misc Info: DILUTION 1.6/8
Vial Number: 2105
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	2.7945	0.5589	ppb	1.66	100.	
11 B	57.9	11.58	ppb	3.04	1000.	
23 Na	15,300.	3,060.	ppb	1.03	200000.	
25 Mg	40,650.	8,130.	ppb	1.80	200000.	
27 Al	76,600.	15,320.	ppb	1.43	200000.	
28 Si	5,570.	1,114.	ppb	6.89	#VALUE!	
29 Si	4,074.5	814.9	ppb	6.02	10000.	
39 K	9,810.	1,962.	ppb	0.88	200000.	
43 Ca	382,200.	76,440.	ppb	0.80	#VALUE!	
44 Ca	357,300.	71,460.	ppb	0.83	200000.	
51 V	170.3	34.06	ppb	1.26	1000.	
52 Cr	144.05	28.81	ppb	1.90	1000.	
53 Cr	183.3	36.66	ppb	2.01	#VALUE!	
55 Mn	1,787.	357.4	ppb	2.12	1000.	
56 Fe	193,400.	38,680.	ppb	1.82	#VALUE!	
57 Fe	186,050.	37,210.	ppb	1.83	100000.	
59 Co	36.125	7.225	ppb	1.19	1000.	
60 Ni	147.1	29.42	ppb	0.68	1000.	
63 Cu	133.5	26.7	ppb	1.51	#VALUE!	
65 Cu	134.95	26.99	ppb	1.12	1000.	
66 Zn	622.	124.4	ppb	1.98	1000.	
68 Zn	616.	123.2	ppb	1.84	#VALUE!	
75 As	73.9	14.78	ppb	0.93	1000.	
82 Se	2.769	0.5538	ppb	49.89	1000.	
88 Sr	2,794.	558.8	ppb	2.01	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	6.735	1.347	ppb	2.71	1000.	
107 Ag	0.4223	0.0845	ppb	11.26	500.	
109 Ag	0.3593	0.0719	ppb	4.39	#VALUE!	
111 Cd	0.844	0.1688	ppb	6.96	#VALUE!	
114 Cd	0.2673	0.0535	ppb	18.17	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	45.465	9.093	ppb	1.54	1000.	
120 Sn	44.79	8.958	ppb	1.42	#VALUE!	
121 Sb	1.0625	0.2125	ppb	11.21	#VALUE!	
123 Sb	1.132	0.2264	ppb	5.20	1000.	
135 Ba	116.3	23.26	ppb	2.89	1000.	
137 Ba	114.1	22.82	ppb	0.87	#VALUE!	
182 W	0.8675	0.1735	ppb ---		#VALUE!	
203 Tl	0.6405	0.1281	ppb	11.95	1000.	
205 Tl	0.7075	0.1415	ppb	2.93	#VALUE!	
208 Pb	197.75	39.55	ppb	1.69	1000.	
232 Th	20.125	4.025	ppb	18.89	1000.	
238 U	9.8	1.96	ppb	2.29	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3310094.00	1.41	3254874.00	101.7	69.5 - 130	
45 Sc	2854659.00	0.66	2845192.80	100.3	69.5 - 130	
72 Ge	629781.69	1.56	628164.81	100.3	69.5 - 130	
159 Tb	5185309.50	1.09	4911963.50	105.6	69.5 - 130	
209 Bi	2876298.50	0.83	2733046.80	105.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000090

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\031SMPL.D\031SMPL.D#
Date Acquired: Jul 23 2014 01:27 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5194-002
Misc Info: DILUTION 1.6/8
Vial Number: 2106
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	1.9185	0.3837	ppb	4.57	100.	
11 B	48.69	9.738	ppb	0.98	1000.	
23 Na	24,180.	4,836.	ppb	1.08	200000.	
25 Mg	41,155.	8,231.	ppb	0.91	200000.	
27 Al	65,650.	13,130.	ppb	0.59	200000.	
28 Si	6,275.	1,255.	ppb	3.65	#VALUE!	
29 Si	4,546.5	909.3	ppb	14.01	10000.	
39 K	9,455.	1,891.	ppb	0.87	200000.	
43 Ca	194,700.	38,940.	ppb	0.66	#VALUE!	
44 Ca	185,300.	37,060.	ppb	0.95	200000.	
51 V	163.35	32.67	ppb	0.35	1000.	
52 Cr	126.85	25.37	ppb	0.70	1000.	
53 Cr	170.45	34.09	ppb	1.38	#VALUE!	
55 Mn	1,602.5	320.5	ppb	0.53	1000.	
56 Fe	126,250.	25,250.	ppb	0.66	#VALUE!	
57 Fe	121,750.	24,350.	ppb	0.44	100000.	
59 Co	29.745	5.949	ppb	0.70	1000.	
60 Ni	100.75	20.15	ppb	0.17	1000.	
63 Cu	101.95	20.39	ppb	0.34	#VALUE!	
65 Cu	102.35	20.47	ppb	0.49	1000.	
66 Zn	436.95	87.39	ppb	0.80	1000.	
68 Zn	424.6	84.92	ppb	0.71	#VALUE!	
75 As	41.84	8.368	ppb	0.60	1000.	
82 Se	1.657	0.3314	ppb	24.73	1000.	
88 Sr	1,396.5	279.3	ppb	0.65	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.823	0.7646	ppb	1.76	1000.	
107 Ag	0.2871	0.0574	ppb	4.91	500.	
109 Ag	0.277	0.0554	ppb	11.68	#VALUE!	
111 Cd	0.3204	0.0641	ppb	56.74	#VALUE!	
114 Cd	0.1758	0.0352	ppb	33.45	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	53.15	10.63	ppb	1.41	1000.	
120 Sn	52.6	10.52	ppb	0.81	#VALUE!	
121 Sb	0.532	0.1064	ppb	9.73	#VALUE!	
123 Sb	0.633	0.1266	ppb	3.92	1000.	
135 Ba	103.55	20.71	ppb	1.45	1000.	
137 Ba	103.05	20.61	ppb	1.12	#VALUE!	
182 W	0.532	0.1064	ppb ---		#VALUE!	
203 Tl	0.7965	0.1593	ppb	4.20	1000.	
205 Tl	0.8265	0.1653	ppb	1.10	#VALUE!	
208 Pb	181.6	36.32	ppb	0.39	1000.	
232 Th	19.67	3.934	ppb	4.51	1000.	
238 U	7.905	1.581	ppb	0.95	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3349807.30	0.77	3254874.00	102.9	69.5 - 130	
45 Sc	2876119.30	0.38	2845192.80	101.1	69.5 - 130	
72 Ge	642044.44	0.30	628164.81	102.2	69.5 - 130	
159 Tb	5267009.00	1.01	4911963.50	107.2	69.5 - 130	
209 Bi	2922705.50	0.16	2733046.80	106.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000091

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\032SMPL.D\032SMPL.D#
Date Acquired: Jul 23 2014 01:30 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5194-003
Misc Info: DILUTION 1.6/8
Vial Number: 2107
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	1.4075	0.2815	ppb	4.88	100.	
11 B	164.85	32.97	ppb	0.89	1000.	
23 Na	22,470.	4,494.	ppb	0.36	200000.	
25 Mg	52,350.	10,470.	ppb	0.37	200000.	
27 Al	115,750.	23,150.	ppb	0.50	200000.	
28 Si	5,735.	1,147.	ppb	10.33	#VALUE!	
29 Si	3,811.5	762.3	ppb	8.79	10000.	
39 K	15,560.	3,112.	ppb	0.60	200000.	
43 Ca	248,950.	49,790.	ppb	0.57	#VALUE!	
44 Ca	237,050.	47,410.	ppb	0.30	200000.	
51 V	296.2	59.24	ppb	1.07	1000.	
52 Cr	274.25	54.85	ppb	0.73	1000.	
53 Cr	310.	62.	ppb	0.88	#VALUE!	
55 Mn	4,563.5	912.7	ppb	0.66	1000.	
56 Fe	379,550.	75,910.	ppb	0.59	#VALUE!	
57 Fe	364,750.	72,950.	ppb	0.96	100000.	
59 Co	78.05	15.61	ppb	0.69	1000.	
60 Ni	1,446.	289.2	ppb	0.41	1000.	
63 Cu	1,428.	285.6	ppb	0.63	#VALUE!	
65 Cu	1,483.	296.6	ppb	0.68	1000.	
66 Zn	562.	112.4	ppb	1.29	1000.	
68 Zn	556.5	111.3	ppb	0.88	#VALUE!	
75 As	59.6	11.92	ppb	0.71	1000.	
82 Se	1.8195	0.3639	ppb	36.71	1000.	
88 Sr	3,033.	606.6	ppb	0.35	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	37.985	7.597	ppb	2.03	1000.	
107 Ag	0.2419	0.0484	ppb	3.05	500.	
109 Ag	0.2161	0.0432	ppb	13.60	#VALUE!	
111 Cd	0.6105	0.1221	ppb	27.30	#VALUE!	
114 Cd	0.504	0.1008	ppb	6.63	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	54.7	10.94	ppb	0.30	1000.	
120 Sn	55.05	11.01	ppb	1.00	#VALUE!	
121 Sb	1.0675	0.2135	ppb	7.57	#VALUE!	
123 Sb	1.1315	0.2263	ppb	3.34	1000.	
135 Ba	174.1	34.82	ppb	0.67	1000.	
137 Ba	174.25	34.85	ppb	0.72	#VALUE!	
182 W	1.6035	0.3207	ppb ---		#VALUE!	
203 Tl	0.8445	0.1689	ppb	11.14	1000.	
205 Tl	0.989	0.1978	ppb	1.97	#VALUE!	
208 Pb	89.1	17.82	ppb	0.25	1000.	
232 Th	30.	6.	ppb	1.52	1000.	
238 U	9.575	1.915	ppb	0.25	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3286871.00	0.96	3254874.00	101.0	69.5 - 130	
45 Sc	2852992.30	0.12	2845192.80	100.3	69.5 - 130	
72 Ge	633705.38	0.41	628164.81	100.9	69.5 - 130	
159 Tb	5110781.50	0.30	4911963.50	104.0	69.5 - 130	
209 Bi	2817905.50	0.55	2733046.80	103.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000092

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\033SMPL.D\033SMPL.D#
Date Acquired: Jul 23 2014 01:33 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5194-004
Misc Info: DILUTION 1.6/8
Vial Number: 2108
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.813	0.7626	ppb	1.65	100.	
11 B	465.25	93.05	ppb	2.00	1000.	
23 Na	59,300.	11,860.	ppb	3.31	200000.	
25 Mg	103,850.	20,770.	ppb	3.18	200000.	
27 Al	120,100.	24,020.	ppb	3.50	200000.	
28 Si	9,600.	1,920.	ppb	10.08	#VALUE!	
29 Si	5,980.	1,196.	ppb	20.78	10000.	
39 K	35,410.	7,082.	ppb	3.29	200000.	
43 Ca	140,750.	28,150.	ppb	2.63	#VALUE!	
44 Ca	134,350.	26,870.	ppb	3.31	200000.	
51 V	343.85	68.77	ppb	1.94	1000.	
52 Cr	562.	112.4	ppb	2.10	1000.	
53 Cr	577.	115.4	ppb	2.37	#VALUE!	
55 Mn	4,067.5	813.5	ppb	2.67	1000.	
56 Fe	323,650.	64,730.	ppb	2.44	#VALUE!	
57 Fe	311,150.	62,230.	ppb	2.42	100000.	
59 Co	87.9	17.58	ppb	1.96	1000.	
60 Ni	417.65	83.53	ppb	1.82	1000.	
63 Cu	1,891.	378.2	ppb	2.68	#VALUE!	
65 Cu	1,911.	382.2	ppb	1.77	1000.	
66 Zn	1,604.	320.8	ppb	2.35	1000.	
68 Zn	1,585.5	317.1	ppb	2.46	#VALUE!	
75 As	190.3	38.06	ppb	2.69	1000.	
82 Se	3.3345	0.6669	ppb	22.99	1000.	
88 Sr	747.5	149.5	ppb	2.31	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	31.21	6.242	ppb	3.91	1000.	
107 Ag	0.6905	0.1381	ppb	5.39	500.	
109 Ag	0.6025	0.1205	ppb	4.15	#VALUE!	
111 Cd	1.869	0.3738	ppb	6.79	#VALUE!	
114 Cd	1.4115	0.2823	ppb	3.61	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	81.95	16.39	ppb	2.92	1000.	
120 Sn	81.95	16.39	ppb	2.54	#VALUE!	
121 Sb	1.548	0.3096	ppb	6.20	#VALUE!	
123 Sb	1.5985	0.3197	ppb	3.92	1000.	
135 Ba	647.	129.4	ppb	2.40	1000.	
137 Ba	655.5	131.1	ppb	3.26	#VALUE!	
182 W	3.057	0.6114	ppb ---		#VALUE!	
203 Tl	1.3615	0.2723	ppb	4.82	1000.	
205 Tl	1.4975	0.2995	ppb	0.91	#VALUE!	
208 Pb	239.	47.8	ppb	2.00	1000.	
232 Th	61.2	12.24	ppb	3.44	1000.	
238 U	12.75	2.55	ppb	2.40	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3338209.00	2.11	3254874.00	102.6	69.5 - 130	
45 Sc	2940780.30	3.32	2845192.80	103.4	69.5 - 130	
72 Ge	645484.63	2.27	628164.81	102.8	69.5 - 130	
159 Tb	5210894.50	2.68	4911963.50	106.1	69.5 - 130	
209 Bi	2824300.50	1.55	2733046.80	103.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000093

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\034SMPL.D\034SMPL.D#
Date Acquired: Jul 23 2014 01:37 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBWHG17IMW1
Misc Info:
Vial Number: 2109
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0015	0.0015	ppb	25.73	100.	
11 B	0.254	0.254	ppb	124.33	1000.	
23 Na	17.44	17.44	ppb	5.81	200000.	
25 Mg	5.392	5.392	ppb	6.88	200000.	
27 Al	4.532	4.532	ppb	12.03	200000.	
28 Si	-97.65	-97.65	ppb	69.60	#VALUE!	
29 Si	-66.92	-66.92	ppb	104.89	10000.	
39 K	-2.593	-2.593	ppb	65.60	200000.	
43 Ca	11.37	11.37	ppb	33.25	#VALUE!	
44 Ca	-1.522	-1.522	ppb	253.94	200000.	
51 V	0.0673	0.0673	ppb	180.75	1000.	
52 Cr	0.0985	0.0985	ppb	5.80	1000.	
53 Cr	3.275	3.275	ppb	7.63	#VALUE!	
55 Mn	0.2733	0.2733	ppb	2.97	1000.	
56 Fe	0.5058	0.5058	ppb	289.44	#VALUE!	
57 Fe	-0.4189	-0.4189	ppb	576.27	100000.	
59 Co	0.0116	0.0116	ppb	18.50	1000.	
60 Ni	0.1352	0.1352	ppb	16.26	1000.	
63 Cu	0.1795	0.1795	ppb	1.48	#VALUE!	
65 Cu	0.1795	0.1795	ppb	18.35	1000.	
66 Zn	0.6811	0.6811	ppb	5.35	1000.	
68 Zn	0.425	0.425	ppb	23.86	#VALUE!	
75 As	0.1576	0.1576	ppb	51.78	1000.	
82 Se	-0.0529	-0.0529	ppb	431.46	1000.	
88 Sr	0.0266	0.0266	ppb	39.73	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.0543	0.0543	ppb	15.22	1000.	
107 Ag	-0.0012	-0.0012	ppb	336.14	500.	
109 Ag	0.0022	0.0022	ppb	74.72	#VALUE!	
111 Cd	-0.1073	-0.1073	ppb	22.39	#VALUE!	
114 Cd	0.0072	0.0072	ppb	94.99	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0946	0.0946	ppb	7.49	1000.	
120 Sn	0.1051	0.1051	ppb	9.46	#VALUE!	
121 Sb	0.0045	0.0045	ppb	148.11	#VALUE!	
123 Sb	0.014	0.014	ppb	35.61	1000.	
135 Ba	0.0896	0.0896	ppb	29.92	1000.	
137 Ba	0.0981	0.0981	ppb	20.09	#VALUE!	
182 W	-0.0007	-0.0007	ppb ---		#VALUE!	
203 Tl	-0.0051	-0.0051	ppb	30.14	1000.	
205 Tl	-0.0007	-0.0007	ppb	272.97	#VALUE!	
208 Pb	0.0676	0.0676	ppb	5.11	1000.	
232 Th	0.1679	0.1679	ppb	47.27	1000.	
238 U	0.0008	0.0008	ppb	82.51	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3342315.30	0.44	3254874.00	102.7	69.5 - 130	
45 Sc	2845117.80	0.66	2845192.80	100.0	69.5 - 130	
72 Ge	635561.94	1.20	628164.81	101.2	69.5 - 130	
159 Tb	5134751.00	1.02	4911963.50	104.5	69.5 - 130	
209 Bi	2933518.50	0.90	2733046.80	107.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000094

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\035SMPL.D\035SMPL.D#
Date Acquired: Jul 23 2014 01:40 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSWHG17IMW1
Misc Info: DILUTION 1.6/8
Vial Number: 2110
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	45.245	9.049	ppb	2.12	100.	
11 B	436.65	87.33	ppb	3.10	1000.	
23 Na	7,595.	1,519.	ppb	2.66	200000.	
25 Mg	5,100.	1,020.	ppb	1.67	200000.	
27 Al	2,004.5	400.9	ppb	2.20	200000.	
28 Si	3,697.	739.4	ppb	24.82	#VALUE!	
29 Si	2,095.5	419.1	ppb	51.80	10000.	
39 K	9,950.	1,990.	ppb	2.47	200000.	
43 Ca	2,885.5	577.1	ppb	5.02	#VALUE!	
44 Ca	2,097.	419.4	ppb	3.08	200000.	
51 V	490.95	98.19	ppb	2.69	1000.	
52 Cr	190.65	38.13	ppb	2.48	1000.	
53 Cr	185.45	37.09	ppb	2.41	#VALUE!	
55 Mn	489.9	97.98	ppb	2.08	1000.	
56 Fe	979.	195.8	ppb	3.71	#VALUE!	
57 Fe	935.	187.	ppb	2.71	100000.	
59 Co	496.45	99.29	ppb	3.25	1000.	
60 Ni	491.5	98.3	ppb	3.19	1000.	
63 Cu	242.05	48.41	ppb	2.31	#VALUE!	
65 Cu	244.4	48.88	ppb	3.19	1000.	
66 Zn	495.3	99.06	ppb	1.96	1000.	
68 Zn	526.5	105.3	ppb	2.85	#VALUE!	
75 As	103.15	20.63	ppb	3.12	1000.	
82 Se	102.	20.4	ppb	4.96	1000.	
88 Sr	509.	101.8	ppb	2.50	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	297.1	59.42	ppb	2.52	1000.	
107 Ag	49.815	9.963	ppb	2.66	500.	
109 Ag	49.935	9.987	ppb	2.10	#VALUE!	
111 Cd	249.2	49.84	ppb	2.70	#VALUE!	
114 Cd	249.05	49.81	ppb	2.70	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	480.95	96.19	ppb	1.70	1000.	
120 Sn	482.6	96.52	ppb	2.10	#VALUE!	
121 Sb	98.8	19.76	ppb	2.37	#VALUE!	
123 Sb	99.8	19.96	ppb	1.91	1000.	
135 Ba	1,902.	380.4	ppb	2.01	1000.	
137 Ba	1,909.5	381.9	ppb	1.99	#VALUE!	
182 W	97.	19.4	ppb ---		#VALUE!	
203 Tl	101.75	20.35	ppb	2.12	1000.	
205 Tl	101.2	20.24	ppb	2.37	#VALUE!	
208 Pb	102.35	20.47	ppb	2.27	1000.	
232 Th	1.2815	0.2563	ppb	13.65	1000.	
238 U	100.1	20.02	ppb	2.20	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3343239.50	1.77	3254874.00	102.7	69.5 - 130	
45 Sc	2839819.00	1.99	2845192.80	99.8	69.5 - 130	
72 Ge	625751.38	2.55	628164.81	99.6	69.5 - 130	
159 Tb	5147820.00	2.13	4911963.50	104.8	69.5 - 130	
209 Bi	2888116.00	2.35	2733046.80	105.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000095

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\036_CCV.D\036_CCV.D#
Date Acquired: Jul 23 2014 01:43 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	22.82	ppb	2.16	25	91.28	
11 B	24.54	ppb	1.94	25	98.16	
23 Na	4,827.	ppb	0.92	5,000	96.54	
25 Mg	4,852.	ppb	1.13	5,000	97.04	
27 Al	489.3	ppb	1.70	500	97.86	
28 Si	281.1	ppb	10.33	500	56.22	
29 Si	31.8	ppb	174.84	500	6.36	Fail
39 K	4,808.	ppb	0.90	5,000	96.16	
43 Ca	4,844.	ppb	3.00	5,000	96.88	
44 Ca	4,881.	ppb	1.45	5,000	97.62	
51 V	23.57	ppb	1.33	25	94.28	
52 Cr	23.82	ppb	1.18	25	95.28	
53 Cr	22.48	ppb	1.80	25	89.92	
55 Mn	23.85	ppb	1.72	25	95.4	
56 Fe	4,780.	ppb	1.11	5,000	95.6	
57 Fe	4,837.	ppb	0.84	5,000	96.74	
59 Co	23.75	ppb	1.42	25	95	
60 Ni	23.68	ppb	0.99	25	94.72	
63 Cu	23.78	ppb	1.48	25	95.12	
65 Cu	23.87	ppb	2.06	25	95.48	
66 Zn	24.28	ppb	1.04	25	97.12	
68 Zn	23.74	ppb	1.65	25	94.96	
75 As	23.62	ppb	2.85	25	94.48	
82 Se	23.56	ppb	2.50	25	94.24	
88 Sr	24.19	ppb	0.83	25	96.76	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.25	ppb	0.58	25	97	
107 Ag	24.45	ppb	1.61	25	97.8	
109 Ag	24.49	ppb	2.03	25	97.96	
111 Cd	24.46	ppb	2.54	25	97.84	
114 Cd	24.53	ppb	0.62	25	98.12	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.78	ppb	1.90	25	95.12	
120 Sn	23.97	ppb	1.49	25	95.88	
121 Sb	23.67	ppb	1.71	25	94.68	
123 Sb	23.54	ppb	1.49	25	94.16	
135 Ba	23.99	ppb	2.77	25	95.96	
137 Ba	23.62	ppb	1.41	25	94.48	
182 W	23.91	ppb	1.10	25	95.64	
203 Tl	23.57	ppb	2.31	25	94.28	
205 Tl	23.87	ppb	1.94	25	95.48	
208 Pb	23.83	ppb	1.96	25	95.32	
232 Th	19.57	ppb	5.85	25	78.28	Fail
238 U	23.53	ppb	2.33	25	94.12	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3279552.30	1.08	3254874.00	100.8	80 - 120.4	
45 Sc	2867219.30	0.52	2845192.80	100.8	80 - 120.4	
72 Ge	634859.75	0.90	628164.81	101.1	80 - 120.4	
159 Tb	5183845.50	0.50	4911963.50	105.5	80 - 120.4	
209 Bi	2909576.50	1.12	2733046.80	106.5	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000096

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\037_CCB.D\037_CCB.D#
Date Acquired: Jul 23 2014 01:46 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0037	ppb	63.85	1.00	
11 B	0.9635	ppb	6.00	1.00	
23 Na	2.509	ppb	4.65	1.00	
25 Mg	0.5118	ppb	19.58	1.00	
27 Al	0.0519	ppb	217.62	1.00	
28 Si	-241.4	ppb	51.74	1.00	
29 Si	-296.	ppb	103.07	1.00	
39 K	-5.218	ppb	210.04	1.00	
43 Ca	0.1892	ppb	1093.00	1.00	
44 Ca	-10.52	ppb	26.92	1.00	
51 V	-0.0278	ppb	295.37	1.00	
52 Cr	-0.0299	ppb	94.51	1.00	
53 Cr	-0.7593	ppb	26.60	1.00	
55 Mn	-0.0041	ppb	464.26	1.00	
56 Fe	-3.341	ppb	100.66	1.00	
57 Fe	-8.95	ppb	26.60	1.00	
59 Co	-0.0156	ppb	19.24	1.00	
60 Ni	0.0078	ppb	45.38	1.00	
63 Cu	-0.0387	ppb	11.37	1.00	
65 Cu	-0.0109	ppb	171.83	1.00	
66 Zn	-0.0045	ppb	1048.00	1.00	
68 Zn	-0.0803	ppb	317.13	1.00	
75 As	0.0422	ppb	219.55	1.00	
82 Se	-0.0193	ppb	883.12	1.00	
88 Sr	0.0077	ppb	40.88	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0684	ppb	7.34	1.00	
107 Ag	-0.0047	ppb	70.77	1.00	
109 Ag	0.0014	ppb	167.28	1.00	
111 Cd	-0.0307	ppb	120.88	1.00	
114 Cd	0.0022	ppb	236.67	1.00	
115 In	--------	---	--------	---	
118 Sn	0.1148	ppb	34.90	1.00	
120 Sn	0.1399	ppb	25.78	1.00	
121 Sb	0.0143	ppb	66.68	1.00	
123 Sb	0.0226	ppb	55.25	1.00	
135 Ba	0.0022	ppb	412.79	1.00	
137 Ba	0.0003	ppb	3326.00	1.00	
182 W	0.0977	ppb	13.59	1.00	
203 Tl	0.0093	ppb	31.23	1.00	
205 Tl	0.0115	ppb	30.99	1.00	
208 Pb	0.0023	ppb	765.06	1.00	
232 Th	0.244	ppb	25.84	1.00	Fail
238 U	0.0034	ppb	7.48	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3324061.00	3.44	3254874.00	102.1	79.5 - 120	
45 Sc	2899248.00	3.51	2845192.80	101.9	79.5 - 120	
72 Ge	639560.00	3.30	628164.81	101.8	79.5 - 120	
159 Tb	5122358.50	3.24	4911963.50	104.3	79.5 - 120	
209 Bi	2913784.00	4.10	2733046.80	106.6	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000097

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\038SMPL.D\038SMPL.D#
Date Acquired: Jul 23 2014 01:50 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5266-001
Misc Info:
Vial Number: 2111
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0023	0.0023	ppb	83.36	100.	
11 B	0.6756	0.6756	ppb	9.75	1000.	
23 Na	2,921.	2,921.	ppb	0.62	200000.	
25 Mg	2,996.	2,996.	ppb	1.12	200000.	
27 Al	15.14	15.14	ppb	2.91	200000.	
28 Si	6,164.	6,164.	ppb	1.08	#VALUE!	
29 Si	4,831.	4,831.	ppb	0.52	10000.	
39 K	3,577.	3,577.	ppb	0.79	200000.	
43 Ca	15,220.	15,220.	ppb	0.70	#VALUE!	
44 Ca	14,780.	14,780.	ppb	0.66	200000.	
51 V	0.1715	0.1715	ppb	24.96	1000.	
52 Cr	0.1316	0.1316	ppb	23.80	1000.	
53 Cr	5.354	5.354	ppb	11.90	#VALUE!	
55 Mn	1.128	1.128	ppb	1.52	1000.	
56 Fe	23.7	23.7	ppb	4.38	#VALUE!	
57 Fe	45.26	45.26	ppb	4.14	100000.	
59 Co	0.013	0.013	ppb	40.46	1000.	
60 Ni	0.5376	0.5376	ppb	4.47	1000.	
63 Cu	6.911	6.911	ppb	0.56	#VALUE!	
65 Cu	6.931	6.931	ppb	1.51	1000.	
66 Zn	7.384	7.384	ppb	2.35	1000.	
68 Zn	7.296	7.296	ppb	3.59	#VALUE!	
75 As	0.2946	0.2946	ppb	50.58	1000.	
82 Se	-0.0336	-0.0336	ppb	383.15	1000.	
88 Sr	64.63	64.63	ppb	0.78	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.8706	0.8706	ppb	3.56	1000.	
107 Ag	0.002	0.002	ppb	199.36	500.	
109 Ag	0.0039	0.0039	ppb	62.34	#VALUE!	
111 Cd	-0.0997	-0.0997	ppb	12.91	#VALUE!	
114 Cd	0.0035	0.0035	ppb	61.90	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1752	0.1752	ppb	11.00	1000.	
120 Sn	0.1757	0.1757	ppb	14.51	#VALUE!	
121 Sb	0.0144	0.0144	ppb	21.53	#VALUE!	
123 Sb	0.0155	0.0155	ppb	35.03	1000.	
135 Ba	7.967	7.967	ppb	0.91	1000.	
137 Ba	7.918	7.918	ppb	1.45	#VALUE!	
182 W	0.0793	0.0793	ppb ---		#VALUE!	
203 Tl	0.0013	0.0013	ppb	216.45	1000.	
205 Tl	0.0081	0.0081	ppb	9.03	#VALUE!	
208 Pb	0.7422	0.7422	ppb	4.27	1000.	
232 Th	0.1549	0.1549	ppb	31.23	1000.	
238 U	1.587	1.587	ppb	1.02	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3310307.00	0.85	3254874.00	101.7	69.5 - 130	
45 Sc	2907748.80	0.80	2845192.80	102.2	69.5 - 130	
72 Ge	649271.50	0.57	628164.81	103.4	69.5 - 130	
159 Tb	5247402.50	0.68	4911963.50	106.8	69.5 - 130	
209 Bi	2940207.80	0.65	2733046.80	107.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000098

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\039SMPL.D\039SMPL.D#
Date Acquired: Jul 23 2014 01:53 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBSHG16IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 2112
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.005	0.001	ppb	132.10	100.	
11 B	3.319	0.6638	ppb	10.35	1000.	
23 Na	33.6	6.72	ppb	2.12	200000.	
25 Mg	19.76	3.952	ppb	9.38	200000.	
27 Al	15.41	3.082	ppb	3.95	200000.	
28 Si	-636.5	-127.3	ppb	136.84	#VALUE!	
29 Si	-437.55	-87.51	ppb	287.05	10000.	
39 K	3.4315	0.6863	ppb	875.71	200000.	
43 Ca	25.965	5.193	ppb	38.17	#VALUE!	
44 Ca	2.05	0.41	ppb	183.98	200000.	
51 V	0.701	0.1402	ppb	37.97	1000.	
52 Cr	0.9215	0.1843	ppb	17.48	1000.	
53 Cr	46.88	9.376	ppb	5.23	#VALUE!	
55 Mn	0.3763	0.0753	ppb	2.51	1000.	
56 Fe	6.34	1.268	ppb	155.28	#VALUE!	
57 Fe	-39.275	-7.855	ppb	38.51	100000.	
59 Co	-0.063	-0.0126	ppb	76.70	1000.	
60 Ni	0.2133	0.0427	ppb	29.64	1000.	
63 Cu	0.3606	0.0721	ppb	5.23	#VALUE!	
65 Cu	0.4359	0.0872	ppb	9.67	1000.	
66 Zn	1.649	0.3298	ppb	17.61	1000.	
68 Zn	0.3812	0.0762	ppb	23.49	#VALUE!	
75 As	1.0415	0.2083	ppb	82.14	1000.	
82 Se	-0.1858	-0.0372	ppb	289.10	1000.	
88 Sr	0.0793	0.0159	ppb	2.63	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.2454	0.0491	ppb	7.43	1000.	
107 Ag	-0.0011	-0.0002	ppb	1606.00	500.	
109 Ag	-0.0125	-0.0025	ppb	106.33	#VALUE!	
111 Cd	-0.2965	-0.0593	ppb	53.24	#VALUE!	
114 Cd	0.0282	0.0056	ppb	188.01	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	14.785	2.957	ppb	3.58	1000.	
120 Sn	15.05	3.01	ppb	2.20	#VALUE!	
121 Sb	0.0294	0.0059	ppb	41.88	#VALUE!	
123 Sb	0.0448	0.009	ppb	52.68	1000.	
135 Ba	0.1841	0.0368	ppb	67.33	1000.	
137 Ba	0.1807	0.0361	ppb	57.43	#VALUE!	
182 W	0.1529	0.0306	ppb ---		#VALUE!	
203 Tl	-0.0101	-0.002	ppb	245.41	1000.	
205 Tl	0.0085	0.0017	ppb	106.27	#VALUE!	
208 Pb	0.0574	0.0115	ppb	32.01	1000.	
232 Th	1.457	0.2914	ppb	32.15	1000.	
238 U	0.0059	0.0012	ppb	71.05	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3343515.30	1.72	3254874.00	102.7	69.5 - 130	
45 Sc	2914379.30	1.48	2845192.80	102.4	69.5 - 130	
72 Ge	649066.44	1.54	628164.81	103.3	69.5 - 130	
159 Tb	5217753.50	1.46	4911963.50	106.2	69.5 - 130	
209 Bi	2911576.50	1.43	2733046.80	106.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000099

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\040SMPL.D\040SMPL.D#
Date Acquired: Jul 23 2014 01:56 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSOHG16IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 2201
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	45.25	9.05	ppb	3.66	100.	
11 B	397.8	79.56	ppb	4.23	1000.	
23 Na	7,125.	1,425.	ppb	4.80	200000.	
25 Mg	4,759.5	951.9	ppb	4.76	200000.	
27 Al	2,049.	409.8	ppb	4.74	200000.	
28 Si	1,945.5	389.1	ppb	43.67	#VALUE!	
29 Si	810.	162.	ppb	210.86	10000.	
39 K	9,365.	1,873.	ppb	5.08	200000.	
43 Ca	2,516.5	503.3	ppb	9.47	#VALUE!	
44 Ca	2,030.	406.	ppb	5.82	200000.	
51 V	492.55	98.51	ppb	4.96	1000.	
52 Cr	194.4	38.88	ppb	4.55	1000.	
53 Cr	253.6	50.72	ppb	5.46	#VALUE!	
55 Mn	498.65	99.73	ppb	4.35	1000.	
56 Fe	1,035.5	207.1	ppb	6.35	#VALUE!	
57 Fe	956.5	191.3	ppb	8.63	100000.	
59 Co	498.85	99.77	ppb	4.78	1000.	
60 Ni	494.2	98.84	ppb	4.16	1000.	
63 Cu	245.95	49.19	ppb	4.40	#VALUE!	
65 Cu	246.15	49.23	ppb	4.17	1000.	
66 Zn	496.4	99.28	ppb	4.78	1000.	
68 Zn	527.5	105.5	ppb	4.98	#VALUE!	
75 As	94.5	18.9	ppb	5.49	1000.	
82 Se	96.15	19.23	ppb	4.27	1000.	
88 Sr	450.45	90.09	ppb	5.37	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	262.75	52.55	ppb	4.67	1000.	
107 Ag	50.95	10.19	ppb	4.94	500.	
109 Ag	50.35	10.07	ppb	4.18	#VALUE!	
111 Cd	230.45	46.09	ppb	4.38	#VALUE!	
114 Cd	230.7	46.14	ppb	4.62	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	458.4	91.68	ppb	3.49	1000.	
120 Sn	459.85	91.97	ppb	3.34	#VALUE!	
121 Sb	94.4	18.88	ppb	3.59	#VALUE!	
123 Sb	94.1	18.82	ppb	3.65	1000.	
135 Ba	1,961.	392.2	ppb	3.51	1000.	
137 Ba	1,967.	393.4	ppb	3.49	#VALUE!	
182 W	85.8	17.16	ppb ---		#VALUE!	
203 Tl	95.4	19.08	ppb	5.46	1000.	
205 Tl	96.55	19.31	ppb	4.66	#VALUE!	
208 Pb	97.55	19.51	ppb	4.93	1000.	
232 Th	2.677	0.5354	ppb	21.48	1000.	
238 U	89.15	17.83	ppb	5.26	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3486105.30	3.81	3254874.00	107.1	69.5 - 130	
45 Sc	2956029.30	3.99	2845192.80	103.9	69.5 - 130	
72 Ge	655403.31	3.93	628164.81	104.3	69.5 - 130	
159 Tb	5287314.50	2.73	4911963.50	107.6	69.5 - 130	
209 Bi	2924252.80	4.21	2733046.80	107.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000100

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\041SMPL.D\041SMPL.D#
Date Acquired: Jul 23 2014 02:00 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-008
Misc Info: DILUTION 1.6/8
Vial Number: 2202
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.165	1.033	ppb	1.39	100.	
11 B	34.23	6.846	ppb	4.79	1000.	
23 Na	3,218.	643.6	ppb	0.29	200000.	
25 Mg	31,140.	6,228.	ppb	0.76	200000.	
27 Al	299,800.	59,960.	ppb	0.77	200000.	
28 Si	24,020.	4,804.	ppb	1.13	#VALUE!	
29 Si	17,065.	3,413.	ppb	3.32	10000.	
39 K	13,790.	2,758.	ppb	0.67	200000.	
43 Ca	92,300.	18,460.	ppb	0.15	#VALUE!	
44 Ca	88,550.	17,710.	ppb	0.62	200000.	
51 V	669.	133.8	ppb	0.48	1000.	
52 Cr	714.5	142.9	ppb	0.62	1000.	
53 Cr	751.	150.2	ppb	1.09	#VALUE!	
55 Mn	6,760.	1,352.	ppb	0.35	1000.	>LDR
56 Fe	300,150.	60,030.	ppb	0.52	#VALUE!	
57 Fe	287,750.	57,550.	ppb	0.41	100000.	
59 Co	103.8	20.76	ppb	1.66	1000.	
60 Ni	215.95	43.19	ppb	0.68	1000.	
63 Cu	282.9	56.58	ppb	1.05	#VALUE!	
65 Cu	285.9	57.18	ppb	0.64	1000.	
66 Zn	767.	153.4	ppb	0.60	1000.	
68 Zn	821.	164.2	ppb	0.25	#VALUE!	
75 As	44.8	8.96	ppb	1.03	1000.	
82 Se	5.965	1.193	ppb	12.36	1000.	
88 Sr	631.	126.2	ppb	0.65	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	16.2	3.24	ppb	2.68	1000.	
107 Ag	0.996	0.1992	ppb	5.86	500.	
109 Ag	0.857	0.1714	ppb	0.29	#VALUE!	
111 Cd	6.34	1.268	ppb	1.42	#VALUE!	
114 Cd	5.545	1.109	ppb	1.62	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	33.81	6.762	ppb	2.17	1000.	
120 Sn	34.06	6.812	ppb	2.06	#VALUE!	
121 Sb	1.072	0.2144	ppb	9.56	#VALUE!	
123 Sb	1.0105	0.2021	ppb	1.76	1000.	
135 Ba	3,040.	608.	ppb	1.91	1000.	
137 Ba	3,079.5	615.9	ppb	1.74	#VALUE!	
182 W	1.7755	0.3551	ppb ---		#VALUE!	
203 Tl	2.455	0.491	ppb	3.66	1000.	
205 Tl	2.504	0.5008	ppb	0.69	#VALUE!	
208 Pb	232.25	46.45	ppb	0.92	1000.	
232 Th	54.35	10.87	ppb	5.81	1000.	
238 U	12.885	2.577	ppb	1.81	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3406385.00	0.87	3254874.00	104.7	69.5 - 130	
45 Sc	3052122.80	0.18	2845192.80	107.3	69.5 - 130	
72 Ge	655293.63	0.38	628164.81	104.3	69.5 - 130	
159 Tb	5251674.50	1.33	4911963.50	106.9	69.5 - 130	
209 Bi	2858637.00	0.35	2733046.80	104.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000101

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\042SMPL.D\042SMPL.D#
Date Acquired: Jul 23 2014 02:03 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-010
Misc Info: DILUTION 1.6/8
Vial Number: 2203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	2.1205	0.4241	ppb	1.53	100.	
11 B	22.06	4.412	ppb	7.87	1000.	
23 Na	3,285.	657.	ppb	0.77	200000.	
25 Mg	7,255.	1,451.	ppb	0.99	200000.	
27 Al	565,000.	113,000.	ppb	0.81	200000.	
28 Si	18,540.	3,708.	ppb	2.06	#VALUE!	
29 Si	12,255.	2,451.	ppb	2.98	10000.	
39 K	5,065.	1,013.	ppb	0.71	200000.	
43 Ca	12,460.	2,492.	ppb	1.97	#VALUE!	
44 Ca	11,725.	2,345.	ppb	1.44	200000.	
51 V	1,061.5	212.3	ppb	0.19	1000.	
52 Cr	238.2	47.64	ppb	0.81	1000.	
53 Cr	293.65	58.73	ppb	1.10	#VALUE!	
55 Mn	1,531.	306.2	ppb	0.72	1000.	
56 Fe	352,550.	70,510.	ppb	0.89	#VALUE!	
57 Fe	337,700.	67,540.	ppb	1.04	100000.	
59 Co	62.35	12.47	ppb	0.70	1000.	
60 Ni	195.95	39.19	ppb	0.97	1000.	
63 Cu	432.25	86.45	ppb	0.56	#VALUE!	
65 Cu	434.7	86.94	ppb	1.07	1000.	
66 Zn	681.5	136.3	ppb	0.78	1000.	
68 Zn	747.	149.4	ppb	0.59	#VALUE!	
75 As	27.275	5.455	ppb	1.49	1000.	
82 Se	1.8575	0.3715	ppb	92.22	1000.	
88 Sr	297.35	59.47	ppb	0.27	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	13.445	2.689	ppb	1.71	1000.	
107 Ag	0.754	0.1508	ppb	9.24	500.	
109 Ag	0.2926	0.0585	ppb	2.84	#VALUE!	
111 Cd	3.6965	0.7393	ppb	7.69	#VALUE!	
114 Cd	0.3929	0.0786	ppb	6.47	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	35.235	7.047	ppb	0.91	1000.	
120 Sn	35.165	7.033	ppb	1.63	#VALUE!	
121 Sb	0.8885	0.1777	ppb	2.72	#VALUE!	
123 Sb	0.957	0.1914	ppb	5.31	1000.	
135 Ba	3,444.	688.8	ppb	0.62	1000.	
137 Ba	3,479.5	695.9	ppb	0.66	#VALUE!	
182 W	0.2774	0.0555	ppb ---		#VALUE!	
203 Tl	2.7295	0.5459	ppb	3.10	1000.	
205 Tl	2.846	0.5692	ppb	3.39	#VALUE!	
208 Pb	144.15	28.83	ppb	0.84	1000.	
232 Th	68.65	13.73	ppb	1.57	1000.	
238 U	18.185	3.637	ppb	1.14	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3369974.00	1.41	3254874.00	103.5	69.5 - 130	
45 Sc	3095404.50	1.11	2845192.80	108.8	69.5 - 130	
72 Ge	654803.94	0.96	628164.81	104.2	69.5 - 130	
159 Tb	5230454.00	0.68	4911963.50	106.5	69.5 - 130	
209 Bi	2843907.80	0.60	2733046.80	104.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000102

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\043SMPL.D\043SMPL.D#
Date Acquired: Jul 23 2014 02:06 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-012
Misc Info: DILUTION 1.6/8
Vial Number: 2204
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.9365	0.7873	ppb	2.24	100.	
11 B	4.737	0.9474	ppb	8.81	1000.	
23 Na	1,263.	252.6	ppb	0.56	200000.	
25 Mg	9,285.	1,857.	ppb	0.13	200000.	
27 Al	28,040.	5,608.	ppb	0.79	200000.	
28 Si	3,758.	751.6	ppb	6.37	#VALUE!	
29 Si	2,582.	516.4	ppb	18.75	10000.	
39 K	8,480.	1,696.	ppb	0.58	200000.	
43 Ca	11,475.	2,295.	ppb	1.79	#VALUE!	
44 Ca	11,130.	2,226.	ppb	0.71	200000.	
51 V	54.45	10.89	ppb	1.80	1000.	
52 Cr	32.54	6.508	ppb	2.66	1000.	
53 Cr	98.05	19.61	ppb	3.36	#VALUE!	
55 Mn	1,064.5	212.9	ppb	1.83	1000.	
56 Fe	53,650.	10,730.	ppb	1.50	#VALUE!	
57 Fe	53,050.	10,610.	ppb	1.16	100000.	
59 Co	12.735	2.547	ppb	0.43	1000.	
60 Ni	21.765	4.353	ppb	2.15	1000.	
63 Cu	19.135	3.827	ppb	2.37	#VALUE!	
65 Cu	19.53	3.906	ppb	3.45	1000.	
66 Zn	219.5	43.9	ppb	0.40	1000.	
68 Zn	215.8	43.16	ppb	2.03	#VALUE!	
75 As	5.84	1.168	ppb	6.47	1000.	
82 Se	1.2645	0.2529	ppb	141.20	1000.	
88 Sr	53.35	10.67	ppb	0.61	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.899	0.5798	ppb	6.56	1000.	
107 Ag	0.0869	0.0174	ppb	11.78	500.	
109 Ag	0.1434	0.0287	ppb	0.90	#VALUE!	
111 Cd	0.4306	0.0861	ppb	14.36	#VALUE!	
114 Cd	0.2505	0.0501	ppb	22.06	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	35.335	7.067	ppb	1.87	1000.	
120 Sn	35.26	7.052	ppb	1.37	#VALUE!	
121 Sb	0.0584	0.0117	ppb	39.80	#VALUE!	
123 Sb	0.0806	0.0161	ppb	36.76	1000.	
135 Ba	117.85	23.57	ppb	1.49	1000.	
137 Ba	119.2	23.84	ppb	1.72	#VALUE!	
182 W	1.209	0.2418	ppb ---		#VALUE!	
203 Tl	1.063	0.2126	ppb	4.27	1000.	
205 Tl	1.127	0.2254	ppb	2.07	#VALUE!	
208 Pb	29.88	5.976	ppb	2.10	1000.	
232 Th	91.3	18.26	ppb	4.31	1000.	
238 U	22.555	4.511	ppb	2.85	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3426625.80	0.46	3254874.00	105.3	69.5 - 130	
45 Sc	2916482.80	0.09	2845192.80	102.5	69.5 - 130	
72 Ge	649935.44	1.05	628164.81	103.5	69.5 - 130	
159 Tb	5237142.00	1.16	4911963.50	106.6	69.5 - 130	
209 Bi	2878025.00	1.95	2733046.80	105.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000103

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\044SMPL.D\044SMPL.D#
Date Acquired: Jul 23 2014 02:10 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-016
Misc Info: DILUTION 1.6/8
Vial Number: 2205
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	8.095	1.619	ppb	1.92	100.	
11 B	11.715	2.343	ppb	3.44	1000.	
23 Na	2,063.	412.6	ppb	1.26	200000.	
25 Mg	10,590.	2,118.	ppb	0.91	200000.	
27 Al	307,250.	61,450.	ppb	0.66	200000.	
28 Si	18,435.	3,687.	ppb	2.87	#VALUE!	
29 Si	12,800.	2,560.	ppb	5.58	10000.	
39 K	12,115.	2,423.	ppb	1.10	200000.	
43 Ca	1,660.5	332.1	ppb	2.21	#VALUE!	
44 Ca	369.95	73.99	ppb	8.42	200000.	
51 V	1,657.	331.4	ppb	0.05	1000.	
52 Cr	396.45	79.29	ppb	0.10	1000.	
53 Cr	444.45	88.89	ppb	0.94	#VALUE!	
55 Mn	808.5	161.7	ppb	0.26	1000.	
56 Fe	491,150.	98,230.	ppb	0.12	#VALUE!	
57 Fe	468,500.	93,700.	ppb	0.19	100000.	
59 Co	28.705	5.741	ppb	1.54	1000.	
60 Ni	173.5	34.7	ppb	1.07	1000.	
63 Cu	470.3	94.06	ppb	0.70	#VALUE!	
65 Cu	474.55	94.91	ppb	0.27	1000.	
66 Zn	753.	150.6	ppb	1.00	1000.	
68 Zn	784.5	156.9	ppb	0.56	#VALUE!	
75 As	76.75	15.35	ppb	0.58	1000.	
82 Se	8.75	1.75	ppb	9.83	1000.	
88 Sr	1,030.5	206.1	ppb	0.65	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	25.155	5.031	ppb	1.97	1000.	
107 Ag	0.4492	0.0898	ppb	0.45	500.	
109 Ag	0.375	0.075	ppb	6.57	#VALUE!	
111 Cd	2.4005	0.4801	ppb	5.82	#VALUE!	
114 Cd	1.8935	0.3787	ppb	1.67	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	36.96	7.392	ppb	0.41	1000.	
120 Sn	36.995	7.399	ppb	1.24	#VALUE!	
121 Sb	3.116	0.6232	ppb	0.59	#VALUE!	
123 Sb	3.38	0.676	ppb	2.90	1000.	
135 Ba	2,134.5	426.9	ppb	0.55	1000.	
137 Ba	2,139.5	427.9	ppb	0.46	#VALUE!	
182 W	0.1295	0.0259	ppb ---		#VALUE!	
203 Tl	4.116	0.8232	ppb	4.07	1000.	
205 Tl	4.166	0.8332	ppb	2.24	#VALUE!	
208 Pb	385.65	77.13	ppb	0.99	1000.	
232 Th	115.15	23.03	ppb	1.93	1000.	
238 U	16.345	3.269	ppb	1.56	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3357469.30	0.82	3254874.00	103.2	69.5 - 130	
45 Sc	3045683.80	1.94	2845192.80	107.0	69.5 - 130	
72 Ge	657646.13	1.90	628164.81	104.7	69.5 - 130	
159 Tb	5188332.00	0.96	4911963.50	105.6	69.5 - 130	
209 Bi	2831380.30	1.03	2733046.80	103.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000104

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\045SMPL.D\045SMPL.D#
Date Acquired: Jul 23 2014 02:13 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-018
Misc Info: DILUTION 1.6/8
Vial Number: 2206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	2.0485	0.4097	ppb	4.74	100.	
11 B	14.325	2.865	ppb	2.53	1000.	
23 Na	1,754.5	350.9	ppb	1.85	200000.	
25 Mg	6,245.	1,249.	ppb	1.65	200000.	
27 Al	618,000.	123,600.	ppb	1.89	200000.	
28 Si	19,400.	3,880.	ppb	1.64	#VALUE!	
29 Si	14,070.	2,814.	ppb	8.65	10000.	
39 K	5,390.	1,078.	ppb	2.06	200000.	
43 Ca	11,245.	2,249.	ppb	2.97	#VALUE!	
44 Ca	10,610.	2,122.	ppb	1.45	200000.	
51 V	1,113.5	222.7	ppb	0.39	1000.	
52 Cr	240.75	48.15	ppb	0.50	1000.	
53 Cr	286.15	57.23	ppb	2.12	#VALUE!	
55 Mn	8,890.	1,778.	ppb	0.99	1000.	>LDR
56 Fe	376,550.	75,310.	ppb	0.74	#VALUE!	
57 Fe	360,850.	72,170.	ppb	0.66	100000.	
59 Co	110.3	22.06	ppb	1.00	1000.	
60 Ni	195.65	39.13	ppb	1.80	1000.	
63 Cu	343.55	68.71	ppb	0.37	#VALUE!	
65 Cu	347.8	69.56	ppb	1.26	1000.	
66 Zn	645.5	129.1	ppb	0.58	1000.	
68 Zn	688.	137.6	ppb	0.66	#VALUE!	
75 As	30.445	6.089	ppb	2.04	1000.	
82 Se	3.2875	0.6575	ppb	24.38	1000.	
88 Sr	265.95	53.19	ppb	1.02	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	16.92	3.384	ppb	2.09	1000.	
107 Ag	0.8755	0.1751	ppb	2.04	500.	
109 Ag	0.4177	0.0835	ppb	10.97	#VALUE!	
111 Cd	3.8605	0.7721	ppb	6.50	#VALUE!	
114 Cd	0.4618	0.0924	ppb	31.48	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	36.06	7.212	ppb	2.03	1000.	
120 Sn	36.09	7.218	ppb	2.07	#VALUE!	
121 Sb	1.011	0.2022	ppb	10.92	#VALUE!	
123 Sb	1.1365	0.2273	ppb	3.27	1000.	
135 Ba	2,439.5	487.9	ppb	0.89	1000.	
137 Ba	2,450.5	490.1	ppb	1.23	#VALUE!	
182 W	0.2082	0.0416	ppb ---		#VALUE!	
203 Tl	3.738	0.7476	ppb	3.88	1000.	
205 Tl	3.7355	0.7471	ppb	1.48	#VALUE!	
208 Pb	170.	34.	ppb	0.50	1000.	
232 Th	77.4	15.48	ppb	1.23	1000.	
238 U	17.935	3.587	ppb	1.15	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3282560.50	1.11	3254874.00	100.9	69.5 - 130	
45 Sc	2954452.80	2.05	2845192.80	103.8	69.5 - 130	
72 Ge	630620.31	1.22	628164.81	100.4	69.5 - 130	
159 Tb	5175325.50	0.97	4911963.50	105.4	69.5 - 130	
209 Bi	2813219.00	0.61	2733046.80	102.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000105

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\046SMPL.D\046SMPL.D#
Date Acquired: Jul 23 2014 02:16 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-020
Misc Info: DILUTION 1.6/8
Vial Number: 2207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	2.9205	0.5841	ppb	2.96	100.	
11 B	9.48	1.896	ppb	9.41	1000.	
23 Na	637.	127.4	ppb	2.86	200000.	
25 Mg	6,215.	1,243.	ppb	2.50	200000.	
27 Al	318,900.	63,780.	ppb	2.29	200000.	
28 Si	19,475.	3,895.	ppb	4.05	#VALUE!	
29 Si	15,030.	3,006.	ppb	11.10	10000.	
39 K	5,755.	1,151.	ppb	3.57	200000.	
43 Ca	2,231.5	446.3	ppb	9.19	#VALUE!	
44 Ca	1,954.5	390.9	ppb	3.60	200000.	
51 V	877.	175.4	ppb	2.27	1000.	
52 Cr	232.25	46.45	ppb	1.96	1000.	
53 Cr	281.45	56.29	ppb	2.00	#VALUE!	
55 Mn	663.5	132.7	ppb	2.42	1000.	
56 Fe	273,000.	54,600.	ppb	2.68	#VALUE!	
57 Fe	261,350.	52,270.	ppb	2.05	100000.	
59 Co	36.63	7.326	ppb	1.77	1000.	
60 Ni	119.65	23.93	ppb	2.77	1000.	
63 Cu	196.4	39.28	ppb	2.35	#VALUE!	
65 Cu	198.1	39.62	ppb	2.25	1000.	
66 Zn	452.5	90.5	ppb	2.76	1000.	
68 Zn	472.6	94.52	ppb	2.29	#VALUE!	
75 As	35.55	7.11	ppb	3.46	1000.	
82 Se	1.688	0.3376	ppb	20.60	1000.	
88 Sr	167.15	33.43	ppb	2.72	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	16.585	3.317	ppb	3.81	1000.	
107 Ag	0.9775	0.1955	ppb	8.04	500.	
109 Ag	0.805	0.161	ppb	4.06	#VALUE!	
111 Cd	2.0985	0.4197	ppb	11.72	#VALUE!	
114 Cd	0.842	0.1684	ppb	9.38	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	32.665	6.533	ppb	2.35	1000.	
120 Sn	33.34	6.668	ppb	2.72	#VALUE!	
121 Sb	1.579	0.3158	ppb	4.50	#VALUE!	
123 Sb	1.5625	0.3125	ppb	1.58	1000.	
135 Ba	1,326.	265.2	ppb	2.48	1000.	
137 Ba	1,329.	265.8	ppb	2.76	#VALUE!	
182 W	0.1464	0.0293	ppb ---		#VALUE!	
203 Tl	2.7905	0.5581	ppb	5.36	1000.	
205 Tl	2.8325	0.5665	ppb	1.34	#VALUE!	
208 Pb	124.05	24.81	ppb	1.93	1000.	
232 Th	52.1	10.42	ppb	2.59	1000.	
238 U	10.955	2.191	ppb	1.12	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3266238.30	2.28	3254874.00	100.3	69.5 - 130	
45 Sc	2857316.50	1.89	2845192.80	100.4	69.5 - 130	
72 Ge	622534.25	1.54	628164.81	99.1	69.5 - 130	
159 Tb	5141510.00	1.69	4911963.50	104.7	69.5 - 130	
209 Bi	2857874.80	1.22	2733046.80	104.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000106

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\047SMPL.D\047SMPL.D#
Date Acquired: Jul 23 2014 02:20 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-022
Misc Info: DILUTION 1.6/8
Vial Number: 2208
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	6.365	1.273	ppb	4.84	100.	
11 B	8.145	1.629	ppb	3.33	1000.	
23 Na	1,508.	301.6	ppb	1.13	200000.	
25 Mg	21,775.	4,355.	ppb	1.50	200000.	
27 Al	510,500.	102,100.	ppb	0.85	200000.	
28 Si	18,230.	3,646.	ppb	1.18	#VALUE!	
29 Si	12,415.	2,483.	ppb	5.95	10000.	
39 K	3,162.5	632.5	ppb	1.67	200000.	
43 Ca	11,055.	2,211.	ppb	2.24	#VALUE!	
44 Ca	10,270.	2,054.	ppb	0.50	200000.	
51 V	1,064.	212.8	ppb	1.22	1000.	
52 Cr	144.95	28.99	ppb	1.03	1000.	
53 Cr	191.15	38.23	ppb	1.53	#VALUE!	
55 Mn	2,658.	531.6	ppb	0.67	1000.	
56 Fe	281,150.	56,230.	ppb	0.87	#VALUE!	
57 Fe	269,750.	53,950.	ppb	0.92	100000.	
59 Co	112.1	22.42	ppb	0.75	1000.	
60 Ni	169.6	33.92	ppb	0.66	1000.	
63 Cu	415.9	83.18	ppb	0.66	#VALUE!	
65 Cu	418.75	83.75	ppb	0.17	1000.	
66 Zn	497.8	99.56	ppb	0.67	1000.	
68 Zn	567.5	113.5	ppb	0.58	#VALUE!	
75 As	8.615	1.723	ppb	8.37	1000.	
82 Se	-1.895	-0.379	ppb	103.80	1000.	
88 Sr	427.15	85.43	ppb	1.03	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	4.628	0.9256	ppb	1.66	1000.	
107 Ag	0.5685	0.1137	ppb	9.02	500.	
109 Ag	0.2836	0.0567	ppb	5.32	#VALUE!	
111 Cd	2.986	0.5972	ppb	4.76	#VALUE!	
114 Cd	0.9135	0.1827	ppb	8.13	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	31.965	6.393	ppb	1.01	1000.	
120 Sn	31.835	6.367	ppb	1.23	#VALUE!	
121 Sb	0.2423	0.0485	ppb	9.93	#VALUE!	
123 Sb	0.2587	0.0517	ppb	14.06	1000.	
135 Ba	3,498.5	699.7	ppb	0.82	1000.	
137 Ba	3,521.	704.2	ppb	1.32	#VALUE!	
182 W	0.1947	0.0389	ppb ---		#VALUE!	
203 Tl	0.7885	0.1577	ppb	1.77	1000.	
205 Tl	0.79	0.158	ppb	2.49	#VALUE!	
208 Pb	70.25	14.05	ppb	1.17	1000.	
232 Th	30.18	6.036	ppb	3.69	1000.	
238 U	7.625	1.525	ppb	1.59	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3212343.00	1.23	3254874.00	98.7	69.5 - 130	
45 Sc	2950766.80	1.95	2845192.80	103.7	69.5 - 130	
72 Ge	618000.25	1.55	628164.81	98.4	69.5 - 130	
159 Tb	5051533.50	0.62	4911963.50	102.8	69.5 - 130	
209 Bi	2762900.50	0.26	2733046.80	101.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000107

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\048_CCV.D\048_CCV.D#
Date Acquired: Jul 23 2014 02:23 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.17	ppb	2.26	25	92.68	
11 B	23.58	ppb	1.90	25	94.32	
23 Na	4,914.	ppb	2.68	5,000	98.28	
25 Mg	4,950.	ppb	2.57	5,000	99	
27 Al	515.6	ppb	4.26	500	103.12	
28 Si	201.8	ppb	89.84	500	40.36	
29 Si	411.7	ppb	49.55	500	82.34	Fail
39 K	4,894.	ppb	3.31	5,000	97.88	
43 Ca	4,874.	ppb	2.17	5,000	97.48	
44 Ca	4,943.	ppb	3.09	5,000	98.86	
51 V	23.78	ppb	2.20	25	95.12	
52 Cr	24.	ppb	2.63	25	96	
53 Cr	23.43	ppb	4.15	25	93.72	
55 Mn	24.14	ppb	2.53	25	96.56	
56 Fe	4,847.	ppb	2.30	5,000	96.94	
57 Fe	4,938.	ppb	3.29	5,000	98.76	
59 Co	24.15	ppb	2.63	25	96.6	
60 Ni	23.59	ppb	3.24	25	94.36	
63 Cu	24.01	ppb	2.01	25	96.04	
65 Cu	24.16	ppb	1.82	25	96.64	
66 Zn	24.4	ppb	3.35	25	97.6	
68 Zn	23.98	ppb	4.49	25	95.92	
75 As	24.03	ppb	1.93	25	96.12	
82 Se	24.11	ppb	0.64	25	96.44	
88 Sr	24.35	ppb	3.02	25	97.4	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.72	ppb	1.52	25	98.88	
107 Ag	25.26	ppb	2.70	25	101.04	
109 Ag	25.3	ppb	2.33	25	101.2	
111 Cd	25.39	ppb	2.37	25	101.56	
114 Cd	25.42	ppb	2.87	25	101.68	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.72	ppb	2.79	25	94.88	
120 Sn	23.88	ppb	3.76	25	95.52	
121 Sb	23.78	ppb	3.82	25	95.12	
123 Sb	23.76	ppb	3.17	25	95.04	
135 Ba	24.26	ppb	3.89	25	97.04	
137 Ba	23.95	ppb	4.71	25	95.8	
182 W	24.98	ppb	3.74	25	99.92	
203 Tl	24.44	ppb	1.65	25	97.76	
205 Tl	24.29	ppb	2.39	25	97.16	
208 Pb	24.48	ppb	3.00	25	97.92	
232 Th	22.91	ppb	2.67	25	91.64	
238 U	24.15	ppb	2.75	25	96.6	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3183833.80	2.68	3254874.00	97.8	80 - 120.4	
45 Sc	2745366.30	3.17	2845192.80	96.5	80 - 120.4	
72 Ge	610874.94	2.76	628164.81	97.2	80 - 120.4	
159 Tb	5081673.50	3.75	4911963.50	103.5	80 - 120.4	
209 Bi	2866507.30	2.97	2733046.80	104.9	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000108

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\049_CCB.D\049_CCB.D#
Date Acquired: Jul 23 2014 02:26 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0031	ppb	63.46	1.00	
11 B	0.3261	ppb	44.43	1.00	
23 Na	-0.5698	ppb	28.66	1.00	
25 Mg	0.5032	ppb	67.57	1.00	
27 Al	3.791	ppb	107.39	1.00	
28 Si	-202.2	ppb	26.41	1.00	
29 Si	349.5	ppb	43.00	1.00	Fail
39 K	5.87	ppb	58.45	1.00	
43 Ca	5.335	ppb	19.64	1.00	
44 Ca	-8.912	ppb	23.27	1.00	
51 V	-0.0594	ppb	57.90	1.00	
52 Cr	-0.0379	ppb	19.11	1.00	
53 Cr	-0.5565	ppb	24.33	1.00	
55 Mn	0.0352	ppb	94.69	1.00	
56 Fe	-15.86	ppb	71.63	1.00	
57 Fe	-4.611	ppb	75.41	1.00	
59 Co	-0.017	ppb	11.54	1.00	
60 Ni	0.0048	ppb	322.25	1.00	
63 Cu	-0.0556	ppb	9.59	1.00	
65 Cu	-0.0443	ppb	36.63	1.00	
66 Zn	-0.0169	ppb	59.79	1.00	
68 Zn	-0.1911	ppb	1.47	1.00	
75 As	0.0797	ppb	199.00	1.00	
82 Se	0.0442	ppb	703.89	1.00	
88 Sr	0.0044	ppb	172.64	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0453	ppb	17.70	1.00	
107 Ag	-0.0002	ppb	413.43	1.00	
109 Ag	-0.0018	ppb	224.16	1.00	
111 Cd	-0.0159	ppb	160.74	1.00	
114 Cd	0.0022	ppb	219.39	1.00	
115 In	--------	---	--------	---	
118 Sn	0.059	ppb	19.20	1.00	
120 Sn	0.0533	ppb	19.76	1.00	
121 Sb	0.0094	ppb	4.55	1.00	
123 Sb	0.0196	ppb	52.61	1.00	
135 Ba	0.0091	ppb	95.12	1.00	
137 Ba	0.0043	ppb	200.78	1.00	
182 W	0.0831	ppb	1.77	1.00	
203 Tl	0.0047	ppb	122.85	1.00	
205 Tl	0.0108	ppb	56.22	1.00	
208 Pb	-0.0031	ppb	81.12	1.00	
232 Th	0.2197	ppb	36.84	1.00	Fail
238 U	0.0014	ppb	68.60	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3206463.50	0.24	3254874.00	98.5	79.5 - 120	
45 Sc	2703328.30	1.01	2845192.80	95.0	79.5 - 120	
72 Ge	604453.94	0.94	628164.81	96.2	79.5 - 120	
159 Tb	5103643.00	0.77	4911963.50	103.9	79.5 - 120	
209 Bi	2913487.80	0.99	2733046.80	106.6	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000109

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\050SMPL.D\050SMPL.D#
Date Acquired: Jul 23 2014 02:30 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-024
Misc Info: DILUTION 1.6/8
Vial Number: 2209
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.6545	0.9309	ppb	1.07	100.	
11 B	4.4195	0.8839	ppb	3.19	1000.	
23 Na	1,199.	239.8	ppb	1.81	200000.	
25 Mg	11,270.	2,254.	ppb	1.98	200000.	
27 Al	32,935.	6,587.	ppb	1.45	200000.	
28 Si	3,885.5	777.1	ppb	14.05	#VALUE!	
29 Si	5,805.	1,161.	ppb	3.43	10000.	
39 K	10,325.	2,065.	ppb	1.34	200000.	
43 Ca	13,170.	2,634.	ppb	2.50	#VALUE!	
44 Ca	12,950.	2,590.	ppb	1.45	200000.	
51 V	64.65	12.93	ppb	1.48	1000.	
52 Cr	34.69	6.938	ppb	1.84	1000.	
53 Cr	87.6	17.52	ppb	2.48	#VALUE!	
55 Mn	2,578.	515.6	ppb	1.27	1000.	
56 Fe	70,450.	14,090.	ppb	1.27	#VALUE!	
57 Fe	69,100.	13,820.	ppb	0.91	100000.	
59 Co	13.255	2.651	ppb	0.68	1000.	
60 Ni	22.78	4.556	ppb	1.01	1000.	
63 Cu	22.69	4.538	ppb	2.87	#VALUE!	
65 Cu	23.325	4.665	ppb	1.97	1000.	
66 Zn	303.55	60.71	ppb	0.54	1000.	
68 Zn	295.45	59.09	ppb	1.99	#VALUE!	
75 As	6.23	1.246	ppb	6.46	1000.	
82 Se	0.536	0.1072	ppb	94.87	1000.	
88 Sr	59.6	11.92	ppb	2.22	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.398	0.6796	ppb	0.87	1000.	
107 Ag	0.0955	0.0191	ppb	20.02	500.	
109 Ag	0.185	0.037	ppb	15.80	#VALUE!	
111 Cd	0.8265	0.1653	ppb	29.61	#VALUE!	
114 Cd	0.3833	0.0767	ppb	14.26	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	33.68	6.736	ppb	1.08	1000.	
120 Sn	33.82	6.764	ppb	2.25	#VALUE!	
121 Sb	0.0691	0.0138	ppb	33.92	#VALUE!	
123 Sb	0.0685	0.0137	ppb	41.77	1000.	
135 Ba	139.35	27.87	ppb	2.17	1000.	
137 Ba	139.05	27.81	ppb	1.85	#VALUE!	
182 W	1.393	0.2786	ppb ---		#VALUE!	
203 Tl	1.355	0.271	ppb	1.95	1000.	
205 Tl	1.34	0.268	ppb	3.94	#VALUE!	
208 Pb	34.075	6.815	ppb	1.57	1000.	
232 Th	99.55	19.91	ppb	2.74	1000.	
238 U	24.57	4.914	ppb	1.30	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3313162.80	0.52	3254874.00	101.8	69.5 - 130	
45 Sc	2727065.80	1.09	2845192.80	95.8	69.5 - 130	
72 Ge	608846.69	1.49	628164.81	96.9	69.5 - 130	
159 Tb	5201218.00	1.25	4911963.50	105.9	69.5 - 130	
209 Bi	2893810.50	1.30	2733046.80	105.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000110

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\051SMPL.D\051SMPL.D#
Date Acquired: Jul 23 2014 02:33 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-029
Misc Info: DILUTION 1.6/8
Vial Number: 2210
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	9.515	1.903	ppb	1.30	100.	
11 B	8.1	1.62	ppb	10.88	1000.	
23 Na	1,966.5	393.3	ppb	1.75	200000.	
25 Mg	32,275.	6,455.	ppb	1.90	200000.	
27 Al	710,500.	142,100.	ppb	2.21	200000.	
28 Si	16,315.	3,263.	ppb	0.76	#VALUE!	
29 Si	10,460.	2,092.	ppb	10.38	10000.	
39 K	4,120.	824.	ppb	2.18	200000.	
43 Ca	12,415.	2,483.	ppb	2.92	#VALUE!	
44 Ca	11,575.	2,315.	ppb	2.20	200000.	
51 V	1,454.	290.8	ppb	2.29	1000.	
52 Cr	206.25	41.25	ppb	2.08	1000.	
53 Cr	247.3	49.46	ppb	2.80	#VALUE!	
55 Mn	4,446.	889.2	ppb	2.29	1000.	
56 Fe	432,300.	86,460.	ppb	2.47	#VALUE!	
57 Fe	413,500.	82,700.	ppb	1.87	100000.	
59 Co	188.15	37.63	ppb	1.80	1000.	
60 Ni	204.05	40.81	ppb	2.32	1000.	
63 Cu	568.5	113.7	ppb	2.14	#VALUE!	
65 Cu	574.5	114.9	ppb	1.79	1000.	
66 Zn	673.5	134.7	ppb	2.95	1000.	
68 Zn	765.5	153.1	ppb	2.86	#VALUE!	
75 As	9.98	1.996	ppb	5.63	1000.	
82 Se	-2.0415	-0.4083	ppb	41.29	1000.	
88 Sr	536.5	107.3	ppb	1.25	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	4.84	0.968	ppb	8.45	1000.	
107 Ag	0.8995	0.1799	ppb	0.51	500.	
109 Ag	0.4551	0.091	ppb	16.89	#VALUE!	
111 Cd	4.5855	0.9171	ppb	3.90	#VALUE!	
114 Cd	1.0175	0.2035	ppb	5.44	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	33.72	6.744	ppb	1.84	1000.	
120 Sn	33.515	6.703	ppb	1.19	#VALUE!	
121 Sb	0.3228	0.0646	ppb	3.50	#VALUE!	
123 Sb	0.3492	0.0698	ppb	8.11	1000.	
135 Ba	5,030.	1,006.	ppb	1.74	1000.	>LDR
137 Ba	5,020.	1,004.	ppb	2.31	#VALUE!	
182 W	0.4238	0.0848	ppb ---		#VALUE!	
203 Tl	0.99	0.198	ppb	2.75	1000.	
205 Tl	1.0385	0.2077	ppb	4.94	#VALUE!	
208 Pb	93.1	18.62	ppb	1.90	1000.	
232 Th	44.2	8.84	ppb	6.10	1000.	
238 U	10.75	2.15	ppb	1.97	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3229573.80	2.30	3254874.00	99.2	69.5 - 130	
45 Sc	3045232.80	2.94	2845192.80	107.0	69.5 - 130	
72 Ge	626660.75	3.10	628164.81	99.8	69.5 - 130	
159 Tb	5137033.00	0.90	4911963.50	104.6	69.5 - 130	
209 Bi	2798444.00	0.48	2733046.80	102.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000111

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\052SMPL.D\052SMPL.D#
Date Acquired: Jul 23 2014 02:37 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-029L
Misc Info: DILUTION 0.4/10
Vial Number: 2211
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	9.8475	0.3939	ppb	2.25	100.	
11 B	7.91	0.3164	ppb	14.25	1000.	
23 Na	2,271.25	90.85	ppb	0.46	200000.	
25 Mg	37,450.	1,498.	ppb	0.63	200000.	
27 Al	789,500.	31,580.	ppb	0.75	200000.	
28 Si	10,947.5	437.9	ppb	4.85	#VALUE!	
29 Si	14,827.5	593.1	ppb	16.38	10000.	
39 K	4,497.5	179.9	ppb	0.96	200000.	
43 Ca	14,222.5	568.9	ppb	4.20	#VALUE!	
44 Ca	12,437.5	497.5	ppb	0.75	200000.	
51 V	1,502.5	60.1	ppb	0.34	1000.	
52 Cr	212.2	8.488	ppb	1.03	1000.	
53 Cr	235.675	9.427	ppb	4.12	#VALUE!	
55 Mn	4,792.5	191.7	ppb	0.57	1000.	
56 Fe	453,250.	18,130.	ppb	0.42	#VALUE!	
57 Fe	439,500.	17,580.	ppb	0.61	100000.	
59 Co	196.15	7.846	ppb	0.80	1000.	
60 Ni	214.125	8.565	ppb	0.44	1000.	
63 Cu	602.75	24.11	ppb	0.74	#VALUE!	
65 Cu	607.	24.28	ppb	0.74	1000.	
66 Zn	710.75	28.43	ppb	0.73	1000.	
68 Zn	797.	31.88	ppb	1.13	#VALUE!	
75 As	7.67	0.3068	ppb	37.88	1000.	
82 Se	-11.385	-0.4554	ppb	25.32	1000.	
88 Sr	550.5	22.02	ppb	0.77	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.2375	0.2095	ppb	6.00	1000.	
107 Ag	0.9168	0.0367	ppb	34.39	500.	
109 Ag	0.4683	0.0187	ppb	27.65	#VALUE!	
111 Cd	2.9025	0.1161	ppb	6.93	#VALUE!	
114 Cd	1.4233	0.0569	ppb	15.28	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	33.9	1.356	ppb	2.10	1000.	
120 Sn	35.	1.4	ppb	2.26	#VALUE!	
121 Sb	0.303	0.0121	ppb	12.76	#VALUE!	
123 Sb	0.3895	0.0156	ppb	25.83	1000.	
135 Ba	5,110.	204.4	ppb	0.25	1000.	
137 Ba	5,122.5	204.9	ppb	0.71	#VALUE!	
182 W	0.4538	0.0182	ppb ---		#VALUE!	
203 Tl	0.9768	0.0391	ppb	22.92	1000.	
205 Tl	1.0235	0.0409	ppb	9.49	#VALUE!	
208 Pb	94.5	3.78	ppb	1.48	1000.	
232 Th	40.425	1.617	ppb	4.29	1000.	
238 U	10.6775	0.4271	ppb	2.43	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3231182.80	0.36	3254874.00	99.3	69.5 - 130	
45 Sc	2793575.30	0.31	2845192.80	98.2	69.5 - 130	
72 Ge	614020.50	0.48	628164.81	97.7	69.5 - 130	
159 Tb	5191958.00	0.57	4911963.50	105.7	69.5 - 130	
209 Bi	2925904.00	0.18	2733046.80	107.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000112

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\053SMPL.D\053SMPL.D#
Date Acquired: Jul 23 2014 02:40 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-029A
Misc Info: DILUTION 1.6/8
Vial Number: 2212
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	19.325	3.865	ppb	2.76	100.	
11 B	196.55	39.31	ppb	3.84	1000.	
23 Na	10,665.	2,133.	ppb	1.24	200000.	
25 Mg	32,760.	6,552.	ppb	1.88	200000.	
27 Al	702,500.	140,500.	ppb	1.71	200000.	
28 Si	20,380.	4,076.	ppb	5.43	#VALUE!	
29 Si	12,995.	2,599.	ppb	4.08	10000.	
39 K	12,915.	2,583.	ppb	1.89	200000.	
43 Ca	13,245.	2,649.	ppb	2.16	#VALUE!	
44 Ca	12,350.	2,470.	ppb	2.27	200000.	
51 V	1,496.5	299.3	ppb	2.89	1000.	
52 Cr	252.95	50.59	ppb	2.71	1000.	
53 Cr	292.3	58.46	ppb	2.92	#VALUE!	
55 Mn	4,440.	888.	ppb	2.23	1000.	
56 Fe	431,100.	86,220.	ppb	2.59	#VALUE!	
57 Fe	413,600.	82,720.	ppb	2.25	100000.	
59 Co	196.	39.2	ppb	2.22	1000.	
60 Ni	222.95	44.59	ppb	2.54	1000.	
63 Cu	593.	118.6	ppb	2.51	#VALUE!	
65 Cu	598.5	119.7	ppb	2.45	1000.	
66 Zn	756.5	151.3	ppb	2.49	1000.	
68 Zn	856.	171.2	ppb	2.54	#VALUE!	
75 As	58.1	11.62	ppb	1.74	1000.	
82 Se	42.5	8.5	ppb	1.60	1000.	
88 Sr	577.	115.4	ppb	2.37	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	52.85	10.57	ppb	0.88	1000.	
107 Ag	10.435	2.087	ppb	1.61	500.	
109 Ag	9.95	1.99	ppb	3.63	#VALUE!	
111 Cd	13.99	2.798	ppb	2.75	#VALUE!	
114 Cd	10.845	2.169	ppb	3.54	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	78.55	15.71	ppb	3.58	1000.	
120 Sn	79.4	15.88	ppb	2.77	#VALUE!	
121 Sb	9.62	1.924	ppb	1.14	#VALUE!	
123 Sb	9.955	1.991	ppb	1.97	1000.	
135 Ba	5,050.	1,010.	ppb	2.90	1000.	>LDR
137 Ba	5,070.	1,014.	ppb	1.76	#VALUE!	
182 W	49.16	9.832	ppb ---		#VALUE!	
203 Tl	10.675	2.135	ppb	2.87	1000.	
205 Tl	10.73	2.146	ppb	0.16	#VALUE!	
208 Pb	102.5	20.5	ppb	1.24	1000.	
232 Th	50.2	10.04	ppb	1.44	1000.	
238 U	20.685	4.137	ppb	2.06	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3152956.30	2.17	3254874.00	96.9	69.5 - 130	
45 Sc	3029911.30	1.06	2845192.80	106.5	69.5 - 130	
72 Ge	623074.00	1.38	628164.81	99.2	69.5 - 130	
159 Tb	5061348.00	1.66	4911963.50	103.0	69.5 - 130	
209 Bi	2727454.30	1.92	2733046.80	99.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000113

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\054SMPL.D\054SMPL.D#
Date Acquired: Jul 23 2014 02:44 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-029S
Misc Info: DILUTION 1.6/8
Vial Number: 2301
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	58.25	11.65	ppb	2.17	100.	
11 B	430.7	86.14	ppb	2.23	1000.	
23 Na	9,115.	1,823.	ppb	0.89	200000.	
25 Mg	48,360.	9,672.	ppb	1.13	200000.	
27 Al	734,000.	146,800.	ppb	1.22	200000.	
28 Si	17,910.	3,582.	ppb	7.16	#VALUE!	
29 Si	10,375.	2,075.	ppb	5.70	10000.	
39 K	12,865.	2,573.	ppb	2.08	200000.	
43 Ca	20,735.	4,147.	ppb	2.58	#VALUE!	
44 Ca	20,080.	4,016.	ppb	1.78	200000.	
51 V	1,891.5	378.3	ppb	1.20	1000.	
52 Cr	371.15	74.23	ppb	0.74	1000.	
53 Cr	415.75	83.15	ppb	1.52	#VALUE!	
55 Mn	5,375.	1,075.	ppb	0.97	1000.	>LDR
56 Fe	416,200.	83,240.	ppb	0.91	#VALUE!	
57 Fe	398,600.	79,720.	ppb	0.73	100000.	
59 Co	660.5	132.1	ppb	1.38	1000.	
60 Ni	678.5	135.7	ppb	0.83	1000.	
63 Cu	818.5	163.7	ppb	1.11	#VALUE!	
65 Cu	826.5	165.3	ppb	1.24	1000.	
66 Zn	1,192.	238.4	ppb	0.86	1000.	
68 Zn	1,319.5	263.9	ppb	0.49	#VALUE!	
75 As	95.65	19.13	ppb	1.23	1000.	
82 Se	80.6	16.12	ppb	2.19	1000.	
88 Sr	1,115.	223.	ppb	1.03	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	225.25	45.05	ppb	0.60	1000.	
107 Ag	49.305	9.861	ppb	0.94	500.	
109 Ag	48.445	9.689	ppb	0.29	#VALUE!	
111 Cd	224.75	44.95	ppb	0.76	#VALUE!	
114 Cd	222.2	44.44	ppb	0.05	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	445.2	89.04	ppb	1.44	1000.	
120 Sn	444.1	88.82	ppb	1.52	#VALUE!	
121 Sb	9.26	1.852	ppb	3.22	#VALUE!	
123 Sb	8.9	1.78	ppb	1.29	1000.	
135 Ba	6,730.	1,346.	ppb	1.42	1000.	>LDR
137 Ba	6,620.	1,324.	ppb	1.52	#VALUE!	
182 W	13.32	2.664	ppb ---		#VALUE!	
203 Tl	97.1	19.42	ppb	1.63	1000.	
205 Tl	96.25	19.25	ppb	1.78	#VALUE!	
208 Pb	186.65	37.33	ppb	1.00	1000.	
232 Th	39.48	7.896	ppb	1.19	1000.	
238 U	105.	21.	ppb	1.46	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3213147.80	1.43	3254874.00	98.7	69.5 - 130	
45 Sc	3030875.50	1.37	2845192.80	106.5	69.5 - 130	
72 Ge	623804.00	1.23	628164.81	99.3	69.5 - 130	
159 Tb	4987651.00	1.04	4911963.50	101.5	69.5 - 130	
209 Bi	2705527.50	2.43	2733046.80	99.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000114

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\055SMPL.D\055SMPL.D#
Date Acquired: Jul 23 2014 02:47 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-029P
Misc Info: DILUTION 1.6/8
Vial Number: 2302
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	58.75	11.75	ppb	0.19	100.	
11 B	424.6	84.92	ppb	1.03	1000.	
23 Na	9,355.	1,871.	ppb	0.84	200000.	
25 Mg	53,400.	10,680.	ppb	0.61	200000.	
27 Al	859,500.	171,900.	ppb	1.09	200000.	
28 Si	17,680.	3,536.	ppb	5.73	#VALUE!	
29 Si	9,505.	1,901.	ppb	0.77	10000.	
39 K	13,390.	2,678.	ppb	1.14	200000.	
43 Ca	23,640.	4,728.	ppb	1.00	#VALUE!	
44 Ca	22,635.	4,527.	ppb	0.91	200000.	
51 V	2,177.	435.4	ppb	0.93	1000.	
52 Cr	420.55	84.11	ppb	0.92	1000.	
53 Cr	458.25	91.65	ppb	1.72	#VALUE!	
55 Mn	7,990.	1,598.	ppb	1.09	1000.	>LDR
56 Fe	515,500.	103,100.	ppb	0.95	#VALUE!	
57 Fe	491,500.	98,300.	ppb	0.95	100000.	
59 Co	708.	141.6	ppb	0.74	1000.	
60 Ni	724.	144.8	ppb	0.77	1000.	
63 Cu	917.5	183.5	ppb	0.74	#VALUE!	
65 Cu	922.	184.4	ppb	1.10	1000.	
66 Zn	1,318.	263.6	ppb	1.21	1000.	
68 Zn	1,454.	290.8	ppb	0.59	#VALUE!	
75 As	93.95	18.79	ppb	1.66	1000.	
82 Se	76.4	15.28	ppb	3.92	1000.	
88 Sr	1,175.5	235.1	ppb	0.29	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	208.	41.6	ppb	0.69	1000.	
107 Ag	49.575	9.915	ppb	0.35	500.	
109 Ag	49.16	9.832	ppb	0.86	#VALUE!	
111 Cd	226.9	45.38	ppb	0.22	#VALUE!	
114 Cd	223.	44.6	ppb	0.94	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	425.7	85.14	ppb	1.68	1000.	
120 Sn	426.6	85.32	ppb	1.73	#VALUE!	
121 Sb	7.865	1.573	ppb	3.42	#VALUE!	
123 Sb	7.74	1.548	ppb	2.79	1000.	
135 Ba	7,530.	1,506.	ppb	1.75	1000.	>LDR
137 Ba	7,370.	1,474.	ppb	2.32	#VALUE!	
182 W	9.885	1.977	ppb ---		#VALUE!	
203 Tl	96.5	19.3	ppb	0.40	1000.	
205 Tl	97.4	19.48	ppb	0.57	#VALUE!	
208 Pb	207.95	41.59	ppb	0.85	1000.	
232 Th	47.175	9.435	ppb	0.22	1000.	
238 U	109.35	21.87	ppb	0.29	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3147286.50	0.25	3254874.00	96.7	69.5 - 130	
45 Sc	3020152.80	0.99	2845192.80	106.1	69.5 - 130	
72 Ge	609876.88	1.39	628164.81	97.1	69.5 - 130	
159 Tb	4937612.00	1.23	4911963.50	100.5	69.5 - 130	
209 Bi	2655416.80	2.27	2733046.80	97.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000115

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\056SMPL.D\056SMPL.D#
Date Acquired: Jul 23 2014 02:50 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-031
Misc Info: DILUTION 1.6/8
Vial Number: 2303
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	11.12	2.224	ppb	0.72	100.	
11 B	14.105	2.821	ppb	13.45	1000.	
23 Na	2,372.	474.4	ppb	0.93	200000.	
25 Mg	47,445.	9,489.	ppb	0.73	200000.	
27 Al	794,500.	158,900.	ppb	0.90	200000.	
28 Si	10,775.	2,155.	ppb	5.30	#VALUE!	
29 Si	5,335.	1,067.	ppb	12.68	10000.	
39 K	3,823.	764.6	ppb	0.34	200000.	
43 Ca	18,090.	3,618.	ppb	0.89	#VALUE!	
44 Ca	17,455.	3,491.	ppb	1.17	200000.	
51 V	1,482.	296.4	ppb	0.29	1000.	
52 Cr	182.7	36.54	ppb	0.30	1000.	
53 Cr	228.85	45.77	ppb	0.60	#VALUE!	
55 Mn	4,183.5	836.7	ppb	0.32	1000.	
56 Fe	431,550.	86,310.	ppb	0.56	#VALUE!	
57 Fe	412,200.	82,440.	ppb	0.49	100000.	
59 Co	191.2	38.24	ppb	0.48	1000.	
60 Ni	213.75	42.75	ppb	1.24	1000.	
63 Cu	643.5	128.7	ppb	0.49	#VALUE!	
65 Cu	647.5	129.5	ppb	0.69	1000.	
66 Zn	753.	150.6	ppb	0.51	1000.	
68 Zn	834.5	166.9	ppb	0.08	#VALUE!	
75 As	10.56	2.112	ppb	10.90	1000.	
82 Se	-5.045	-1.009	ppb	7.99	1000.	LOW
88 Sr	518.	103.6	ppb	0.76	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.745	1.149	ppb	1.51	1000.	
107 Ag	0.937	0.1874	ppb	4.31	500.	
109 Ag	0.4571	0.0914	ppb	4.47	#VALUE!	
111 Cd	4.8165	0.9633	ppb	5.25	#VALUE!	
114 Cd	1.2285	0.2457	ppb	12.43	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	34.375	6.875	ppb	1.37	1000.	
120 Sn	34.21	6.842	ppb	1.18	#VALUE!	
121 Sb	0.3768	0.0754	ppb	6.61	#VALUE!	
123 Sb	0.3557	0.0711	ppb	31.45	1000.	
135 Ba	4,430.5	886.1	ppb	0.53	1000.	
137 Ba	4,465.5	893.1	ppb	0.29	#VALUE!	
182 W	0.4815	0.0963	ppb ---		#VALUE!	
203 Tl	1.0415	0.2083	ppb	3.52	1000.	
205 Tl	1.1185	0.2237	ppb	1.13	#VALUE!	
208 Pb	96.2	19.24	ppb	0.70	1000.	
232 Th	39.97	7.994	ppb	0.28	1000.	
238 U	10.91	2.182	ppb	1.14	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3069878.50	1.16	3254874.00	94.3	69.5 - 130	
45 Sc	2956139.00	2.63	2845192.80	103.9	69.5 - 130	
72 Ge	612472.19	2.71	628164.81	97.5	69.5 - 130	
159 Tb	5037646.00	0.99	4911963.50	102.6	69.5 - 130	
209 Bi	2729456.30	1.24	2733046.80	99.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000116

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\057SMPL.D\057SMPL.D#
Date Acquired: Jul 23 2014 02:54 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-033
Misc Info: DILUTION 1.6/8
Vial Number: 2304
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.135	1.027	ppb	1.00	100.	
11 B	20.26	4.052	ppb	2.18	1000.	
23 Na	1,200.5	240.1	ppb	0.84	200000.	
25 Mg	15,895.	3,179.	ppb	1.50	200000.	
27 Al	326,650.	65,330.	ppb	1.51	200000.	
28 Si	16,535.	3,307.	ppb	3.42	#VALUE!	
29 Si	11,890.	2,378.	ppb	2.66	10000.	
39 K	3,301.5	660.3	ppb	1.12	200000.	
43 Ca	25,645.	5,129.	ppb	3.03	#VALUE!	
44 Ca	25,365.	5,073.	ppb	1.26	200000.	
51 V	1,257.5	251.5	ppb	1.58	1000.	
52 Cr	96.75	19.35	ppb	1.09	1000.	
53 Cr	140.4	28.08	ppb	0.95	#VALUE!	
55 Mn	852.	170.4	ppb	1.28	1000.	
56 Fe	176,800.	35,360.	ppb	1.58	#VALUE!	
57 Fe	169,450.	33,890.	ppb	1.35	100000.	
59 Co	73.35	14.67	ppb	1.76	1000.	
60 Ni	89.65	17.93	ppb	2.04	1000.	
63 Cu	248.35	49.67	ppb	1.71	#VALUE!	
65 Cu	252.45	50.49	ppb	1.76	1000.	
66 Zn	398.3	79.66	ppb	1.20	1000.	
68 Zn	445.15	89.03	ppb	1.92	#VALUE!	
75 As	7.94	1.588	ppb	2.72	1000.	
82 Se	-1.2705	-0.2541	ppb	58.72	1000.	
88 Sr	623.	124.6	ppb	1.46	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	7.03	1.406	ppb	1.57	1000.	
107 Ag	0.4392	0.0878	ppb	5.30	500.	
109 Ag	0.2389	0.0478	ppb	6.24	#VALUE!	
111 Cd	2.305	0.461	ppb	19.30	#VALUE!	
114 Cd	0.7845	0.1569	ppb	3.61	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	30.08	6.016	ppb	1.93	1000.	
120 Sn	30.075	6.015	ppb	1.45	#VALUE!	
121 Sb	0.219	0.0438	ppb	19.76	#VALUE!	
123 Sb	0.261	0.0522	ppb	7.01	1000.	
135 Ba	2,181.5	436.3	ppb	1.63	1000.	
137 Ba	2,182.	436.4	ppb	1.26	#VALUE!	
182 W	0.3643	0.0729	ppb ---		#VALUE!	
203 Tl	0.8005	0.1601	ppb	8.86	1000.	
205 Tl	0.8015	0.1603	ppb	0.65	#VALUE!	
208 Pb	43.34	8.668	ppb	0.92	1000.	
232 Th	18.57	3.714	ppb	1.85	1000.	
238 U	18.21	3.642	ppb	0.67	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3060891.30	0.61	3254874.00	94.0	69.5 - 130	
45 Sc	2769764.80	1.39	2845192.80	97.3	69.5 - 130	
72 Ge	596726.56	0.92	628164.81	95.0	69.5 - 130	
159 Tb	4998575.50	0.86	4911963.50	101.8	69.5 - 130	
209 Bi	2815225.30	0.84	2733046.80	103.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000117

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\058SMPL.D\058SMPL.D#
Date Acquired: Jul 23 2014 02:57 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-035
Misc Info: DILUTION 1.6/8
Vial Number: 2305
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	17.96	3.592	ppb	1.58	100.	
11 B	30.25	6.05	ppb	0.80	1000.	
23 Na	733.	146.6	ppb	0.63	200000.	
25 Mg	46,270.	9,254.	ppb	0.65	200000.	
27 Al	780,000.	156,000.	ppb	0.79	200000.	
28 Si	16,530.	3,306.	ppb	4.08	#VALUE!	
29 Si	8,965.	1,793.	ppb	2.60	10000.	
39 K	9,120.	1,824.	ppb	1.19	200000.	
43 Ca	14,465.	2,893.	ppb	1.11	#VALUE!	
44 Ca	13,440.	2,688.	ppb	0.77	200000.	
51 V	1,440.5	288.1	ppb	1.59	1000.	
52 Cr	212.9	42.58	ppb	2.01	1000.	
53 Cr	257.35	51.47	ppb	2.05	#VALUE!	
55 Mn	3,659.5	731.9	ppb	1.72	1000.	
56 Fe	472,350.	94,470.	ppb	1.72	#VALUE!	
57 Fe	451,150.	90,230.	ppb	1.30	100000.	
59 Co	198.4	39.68	ppb	0.79	1000.	
60 Ni	209.4	41.88	ppb	0.93	1000.	
63 Cu	671.	134.2	ppb	1.52	#VALUE!	
65 Cu	679.5	135.9	ppb	1.69	1000.	
66 Zn	927.5	185.5	ppb	0.77	1000.	
68 Zn	1,441.5	288.3	ppb	1.38	#VALUE!	
75 As	22.515	4.503	ppb	4.69	1000.	
82 Se	-1.998	-0.3996	ppb	141.09	1000.	
88 Sr	398.	79.6	ppb	1.29	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	11.475	2.295	ppb	3.17	1000.	
107 Ag	1.581	0.3162	ppb	5.64	500.	
109 Ag	1.097	0.2194	ppb	3.74	#VALUE!	
111 Cd	5.935	1.187	ppb	2.10	#VALUE!	
114 Cd	2.11	0.422	ppb	2.73	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	36.13	7.226	ppb	1.17	1000.	
120 Sn	35.905	7.181	ppb	1.86	#VALUE!	
121 Sb	0.866	0.1732	ppb	3.34	#VALUE!	
123 Sb	0.875	0.175	ppb	4.96	1000.	
135 Ba	22,255.	4,451.	ppb	0.79	1000.	>LDR
137 Ba	22,150.	4,430.	ppb	1.24	#VALUE!	
182 W	1.965	0.393	ppb ---		#VALUE!	
203 Tl	1.5925	0.3185	ppb	8.19	1000.	
205 Tl	1.649	0.3298	ppb	5.62	#VALUE!	
208 Pb	420.6	84.12	ppb	1.95	1000.	
232 Th	59.05	11.81	ppb	1.83	1000.	
238 U	16.085	3.217	ppb	2.43	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3038861.50	1.49	3254874.00	93.4	69.5 - 130	
45 Sc	3003611.50	0.68	2845192.80	105.6	69.5 - 130	
72 Ge	607322.19	1.89	628164.81	96.7	69.5 - 130	
159 Tb	4927029.00	0.98	4911963.50	100.3	69.5 - 130	
209 Bi	2642924.30	2.34	2733046.80	96.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000118

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\059SMPL.D\059SMPL.D#
Date Acquired: Jul 23 2014 03:01 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-039
Misc Info: DILUTION 1.6/8
Vial Number: 2306
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.655	1.131	ppb	2.62	100.	
11 B	14.855	2.971	ppb	3.21	1000.	
23 Na	13,225.	2,645.	ppb	2.44	200000.	
25 Mg	25,650.	5,130.	ppb	2.19	200000.	
27 Al	328,850.	65,770.	ppb	2.55	200000.	
28 Si	17,415.	3,483.	ppb	6.44	#VALUE!	
29 Si	12,835.	2,567.	ppb	5.24	10000.	
39 K	5,815.	1,163.	ppb	3.07	200000.	
43 Ca	52,550.	10,510.	ppb	2.34	#VALUE!	
44 Ca	51,200.	10,240.	ppb	3.00	200000.	
51 V	890.5	178.1	ppb	3.68	1000.	
52 Cr	158.75	31.75	ppb	3.39	1000.	
53 Cr	217.95	43.59	ppb	2.53	#VALUE!	
55 Mn	1,504.5	300.9	ppb	2.87	1000.	
56 Fe	196,250.	39,250.	ppb	2.71	#VALUE!	
57 Fe	188,100.	37,620.	ppb	2.77	100000.	
59 Co	88.6	17.72	ppb	3.42	1000.	
60 Ni	171.85	34.37	ppb	2.62	1000.	
63 Cu	546.5	109.3	ppb	3.27	#VALUE!	
65 Cu	553.5	110.7	ppb	3.01	1000.	
66 Zn	587.5	117.5	ppb	2.78	1000.	
68 Zn	627.	125.4	ppb	4.01	#VALUE!	
75 As	11.185	2.237	ppb	3.45	1000.	
82 Se	1.613	0.3226	ppb	80.56	1000.	
88 Sr	1,018.5	203.7	ppb	3.07	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	4.5355	0.9071	ppb	2.98	1000.	
107 Ag	0.7785	0.1557	ppb	6.87	500.	
109 Ag	0.6725	0.1345	ppb	11.55	#VALUE!	
111 Cd	2.9305	0.5861	ppb	8.25	#VALUE!	
114 Cd	2.1665	0.4333	ppb	5.70	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	30.23	6.046	ppb	3.68	1000.	
120 Sn	30.24	6.048	ppb	3.82	#VALUE!	
121 Sb	0.4819	0.0964	ppb	12.36	#VALUE!	
123 Sb	0.5505	0.1101	ppb	6.28	1000.	
135 Ba	2,233.5	446.7	ppb	3.48	1000.	
137 Ba	2,234.	446.8	ppb	3.17	#VALUE!	
182 W	0.3826	0.0765	ppb ---		#VALUE!	
203 Tl	1.487	0.2974	ppb	6.47	1000.	
205 Tl	1.4465	0.2893	ppb	3.26	#VALUE!	
208 Pb	77.6	15.52	ppb	3.31	1000.	
232 Th	21.77	4.354	ppb	3.13	1000.	
238 U	8.485	1.697	ppb	2.73	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	3024076.50	2.31	3254874.00	92.9	69.5 - 130	
45 Sc	2705558.00	1.57	2845192.80	95.1	69.5 - 130	
72 Ge	586662.69	1.18	628164.81	93.4	69.5 - 130	
159 Tb	4984478.50	2.26	4911963.50	101.5	69.5 - 130	
209 Bi	2803486.80	3.53	2733046.80	102.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000119

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\060_CCV.D\060_CCV.D#
Date Acquired: Jul 23 2014 03:04 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.9	ppb	1.46	25	95.6	
11 B	24.43	ppb	1.80	25	97.72	
23 Na	4,905.	ppb	0.52	5,000	98.1	
25 Mg	4,942.	ppb	0.71	5,000	98.84	
27 Al	498.6	ppb	0.43	500	99.72	
28 Si	219.2	ppb	19.55	500	43.84	
29 Si	211.7	ppb	50.78	500	42.34	Fail
39 K	4,907.	ppb	0.58	5,000	98.14	
43 Ca	4,935.	ppb	1.06	5,000	98.7	
44 Ca	5,033.	ppb	0.50	5,000	100.66	
51 V	24.14	ppb	0.74	25	96.56	
52 Cr	24.31	ppb	1.03	25	97.24	
53 Cr	23.42	ppb	2.31	25	93.68	
55 Mn	24.43	ppb	0.69	25	97.72	
56 Fe	4,903.	ppb	0.67	5,000	98.06	
57 Fe	4,978.	ppb	0.90	5,000	99.56	
59 Co	24.53	ppb	1.11	25	98.12	
60 Ni	24.39	ppb	0.83	25	97.56	
63 Cu	24.53	ppb	0.86	25	98.12	
65 Cu	24.66	ppb	0.23	25	98.64	
66 Zn	24.81	ppb	1.57	25	99.24	
68 Zn	24.85	ppb	1.35	25	99.4	
75 As	24.49	ppb	0.47	25	97.96	
82 Se	24.64	ppb	1.10	25	98.56	
88 Sr	25.19	ppb	1.17	25	100.76	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.11	ppb	0.07	25	100.44	
107 Ag	25.87	ppb	0.51	25	103.48	
109 Ag	25.74	ppb	0.14	25	102.96	
111 Cd	25.9	ppb	1.17	25	103.6	
114 Cd	25.91	ppb	0.43	25	103.64	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.03	ppb	0.98	25	96.12	
120 Sn	24.25	ppb	0.93	25	97	
121 Sb	24.12	ppb	2.08	25	96.48	
123 Sb	24.01	ppb	1.57	25	96.04	
135 Ba	23.88	ppb	0.64	25	95.52	
137 Ba	24.12	ppb	1.92	25	96.48	
182 W	25.	ppb	1.59	25	100	
203 Tl	24.39	ppb	0.43	25	97.56	
205 Tl	24.54	ppb	1.20	25	98.16	
208 Pb	24.61	ppb	0.59	25	98.44	
232 Th	23.23	ppb	2.18	25	92.92	
238 U	24.13	ppb	0.74	25	96.52	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2895058.00	0.87	3254874.00	88.9	80 - 120.4	
45 Sc	2598972.50	0.20	2845192.80	91.3	80 - 120.4	
72 Ge	579249.19	0.58	628164.81	92.2	80 - 120.4	
159 Tb	4870884.00	1.57	4911963.50	99.2	80 - 120.4	
209 Bi	2764278.00	1.26	2733046.80	101.1	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000120

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\061_CCB.D\061_CCB.D#
Date Acquired: Jul 23 2014 03:07 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0049	ppb	44.63	1.00	
11 B	0.4081	ppb	23.10	1.00	
23 Na	-0.9575	ppb	21.77	1.00	
25 Mg	0.6385	ppb	5.83	1.00	
27 Al	2.117	ppb	9.73	1.00	
28 Si	-301.3	ppb	28.46	1.00	
29 Si	-32.56	ppb	115.26	1.00	
39 K	-2.201	ppb	105.13	1.00	
43 Ca	2.554	ppb	210.30	1.00	
44 Ca	-9.665	ppb	38.59	1.00	
51 V	-0.0253	ppb	164.81	1.00	
52 Cr	-0.0367	ppb	22.96	1.00	
53 Cr	-0.6369	ppb	29.06	1.00	
55 Mn	0.0467	ppb	5.95	1.00	
56 Fe	-13.6	ppb	67.14	1.00	
57 Fe	-0.7116	ppb	735.39	1.00	
59 Co	-0.0143	ppb	44.03	1.00	
60 Ni	-0.016	ppb	88.46	1.00	
63 Cu	-0.0176	ppb	36.97	1.00	
65 Cu	-0.0138	ppb	78.54	1.00	
66 Zn	-0.0251	ppb	60.91	1.00	
68 Zn	0.3121	ppb	53.41	1.00	
75 As	0.0241	ppb	387.86	1.00	
82 Se	-0.2097	ppb	65.00	1.00	
88 Sr	0.0094	ppb	43.51	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0392	ppb	5.20	1.00	
107 Ag	0.0002	ppb	946.90	1.00	
109 Ag	0.0013	ppb	355.62	1.00	
111 Cd	-0.032	ppb	17.81	1.00	
114 Cd	0.005	ppb	81.96	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0629	ppb	39.36	1.00	
120 Sn	0.0693	ppb	23.85	1.00	
121 Sb	0.0149	ppb	4.31	1.00	
123 Sb	0.0195	ppb	39.18	1.00	
135 Ba	0.0221	ppb	56.99	1.00	
137 Ba	0.0112	ppb	44.47	1.00	
182 W	0.0827	ppb	6.72	1.00	
203 Tl	-0.0014	ppb	211.39	1.00	
205 Tl	0.0135	ppb	22.77	1.00	
208 Pb	-0.0002	ppb	2658.30	1.00	
232 Th	0.2169	ppb	31.39	1.00	Fail
238 U	0.002	ppb	36.40	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2980284.00	1.25	3254874.00	91.6	79.5 - 120	
45 Sc	2622414.30	0.64	2845192.80	92.2	79.5 - 120	
72 Ge	585718.19	0.75	628164.81	93.2	79.5 - 120	
159 Tb	4878963.50	0.56	4911963.50	99.3	79.5 - 120	
209 Bi	2787550.00	0.36	2733046.80	102.0	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000121

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\062SMPL.D\062SMPL.D#
Date Acquired: Jul 23 2014 03:11 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5267-001
Misc Info:
Vial Number: 2307
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0039	0.0039	ppb	9.38	100.	
11 B	0.5412	0.5412	ppb	11.91	1000.	
23 Na	820.3	820.3	ppb	2.37	200000.	
25 Mg	3,801.	3,801.	ppb	2.35	200000.	
27 Al	3.834	3.834	ppb	5.32	200000.	
28 Si	2,156.	2,156.	ppb	7.19	#VALUE!	
29 Si	1,890.	1,890.	ppb	15.04	10000.	
39 K	354.7	354.7	ppb	3.96	200000.	
43 Ca	44,410.	44,410.	ppb	2.71	#VALUE!	
44 Ca	42,490.	42,490.	ppb	1.90	200000.	
51 V	0.0597	0.0597	ppb	76.27	1000.	
52 Cr	0.1705	0.1705	ppb	11.52	1000.	
53 Cr	5.415	5.415	ppb	6.04	#VALUE!	
55 Mn	0.3184	0.3184	ppb	1.39	1000.	
56 Fe	12.27	12.27	ppb	13.89	#VALUE!	
57 Fe	91.49	91.49	ppb	13.34	100000.	
59 Co	0.048	0.048	ppb	12.45	1000.	
60 Ni	0.096	0.096	ppb	32.35	1000.	
63 Cu	5.213	5.213	ppb	0.75	#VALUE!	
65 Cu	5.37	5.37	ppb	3.42	1000.	
66 Zn	11.5	11.5	ppb	1.00	1000.	
68 Zn	11.	11.	ppb	2.26	#VALUE!	
75 As	0.1303	0.1303	ppb	156.49	1000.	
82 Se	0.0226	0.0226	ppb	1429.10	1000.	
88 Sr	189.	189.	ppb	0.69	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.0489	0.0489	ppb	8.05	1000.	
107 Ag	0.0028	0.0028	ppb	152.06	500.	
109 Ag	0.005	0.005	ppb	40.38	#VALUE!	
111 Cd	-0.063	-0.063	ppb	64.66	#VALUE!	
114 Cd	0.0091	0.0091	ppb	30.70	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1248	0.1248	ppb	9.33	1000.	
120 Sn	0.1426	0.1426	ppb	7.31	#VALUE!	
121 Sb	0.0074	0.0074	ppb	24.26	#VALUE!	
123 Sb	0.0098	0.0098	ppb	29.43	1000.	
135 Ba	0.6971	0.6971	ppb	9.84	1000.	
137 Ba	0.6735	0.6735	ppb	9.86	#VALUE!	
182 W	0.021	0.021	ppb ---		#VALUE!	
203 Tl	-0.0007	-0.0007	ppb	255.82	1000.	
205 Tl	0.0025	0.0025	ppb	153.84	#VALUE!	
208 Pb	0.2634	0.2634	ppb	1.97	1000.	
232 Th	0.154	0.154	ppb	9.25	1000.	
238 U	0.1586	0.1586	ppb	1.95	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2983028.00	0.62	3254874.00	91.6	69.5 - 130	
45 Sc	2648188.50	2.13	2845192.80	93.1	69.5 - 130	
72 Ge	596757.19	0.93	628164.81	95.0	69.5 - 130	
159 Tb	4984434.00	0.97	4911963.50	101.5	69.5 - 130	
209 Bi	2806626.50	0.24	2733046.80	102.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000122

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\063SMPL.D\063SMPL.D#
Date Acquired: Jul 23 2014 03:14 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5279-001
Misc Info:
Vial Number: 2308
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0043	0.0043	ppb	42.56	100.	
11 B	410.1	410.1	ppb	0.69	1000.	
23 Na	208,600.	208,600.	ppb	1.83	200000.	>LDR
25 Mg	3,495.	3,495.	ppb	1.20	200000.	
27 Al	673.1	673.1	ppb	1.24	200000.	
28 Si	1,204.	1,204.	ppb	8.69	#VALUE!	
29 Si	851.4	851.4	ppb	7.68	10000.	
39 K	8,511.	8,511.	ppb	0.93	200000.	
43 Ca	11,410.	11,410.	ppb	1.69	#VALUE!	
44 Ca	11,170.	11,170.	ppb	1.02	200000.	
51 V	0.5756	0.5756	ppb	11.01	1000.	
52 Cr	0.5451	0.5451	ppb	2.18	1000.	
53 Cr	5.279	5.279	ppb	1.34	#VALUE!	
55 Mn	10.4	10.4	ppb	0.95	1000.	
56 Fe	53.51	53.51	ppb	3.82	#VALUE!	
57 Fe	64.44	64.44	ppb	5.22	100000.	
59 Co	43.59	43.59	ppb	0.96	1000.	
60 Ni	107.6	107.6	ppb	0.02	1000.	
63 Cu	12.77	12.77	ppb	1.31	#VALUE!	
65 Cu	10.82	10.82	ppb	1.43	1000.	
66 Zn	22.03	22.03	ppb	0.73	1000.	
68 Zn	21.92	21.92	ppb	2.55	#VALUE!	
75 As	1.869	1.869	ppb	10.90	1000.	
82 Se	7.986	7.986	ppb	3.54	1000.	
88 Sr	105.7	105.7	ppb	0.90	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	593.9	593.9	ppb	1.38	1000.	
107 Ag	0.0609	0.0609	ppb	4.44	500.	
109 Ag	0.0641	0.0641	ppb	10.82	#VALUE!	
111 Cd	0.1501	0.1501	ppb	19.71	#VALUE!	
114 Cd	0.2018	0.2018	ppb	9.86	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1329	0.1329	ppb	17.06	1000.	
120 Sn	0.13	0.13	ppb	6.78	#VALUE!	
121 Sb	0.6717	0.6717	ppb	1.19	#VALUE!	
123 Sb	0.6963	0.6963	ppb	1.61	1000.	
135 Ba	5.994	5.994	ppb	1.09	1000.	
137 Ba	5.956	5.956	ppb	2.30	#VALUE!	
182 W	87.67	87.67	ppb ---		#VALUE!	
203 Tl	0.0107	0.0107	ppb	32.51	1000.	
205 Tl	0.0082	0.0082	ppb	96.31	#VALUE!	
208 Pb	0.5018	0.5018	ppb	2.28	1000.	
232 Th	0.2914	0.2914	ppb	14.99	1000.	
238 U	0.0525	0.0525	ppb	3.63	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2712750.30	0.29	3254874.00	83.3	69.5 - 130	
45 Sc	2561703.30	2.29	2845192.80	90.0	69.5 - 130	
72 Ge	570552.63	1.96	628164.81	90.8	69.5 - 130	
159 Tb	4611813.50	1.91	4911963.50	93.9	69.5 - 130	
209 Bi	2457974.80	2.12	2733046.80	89.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000123

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\064SMPL.D\064SMPL.D#
Date Acquired: Jul 23 2014 03:18 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5281-001
Misc Info:
Vial Number: 2309
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0037	0.0037	ppb	71.99	100.	
11 B	93.84	93.84	ppb	0.35	1000.	
23 Na	42,170.	42,170.	ppb	0.64	200000.	
25 Mg	3,619.	3,619.	ppb	1.16	200000.	
27 Al	19.28	19.28	ppb	4.39	200000.	
28 Si	2,723.	2,723.	ppb	3.58	#VALUE!	
29 Si	1,989.	1,989.	ppb	4.04	10000.	
39 K	6,487.	6,487.	ppb	0.57	200000.	
43 Ca	35,520.	35,520.	ppb	0.63	#VALUE!	
44 Ca	34,140.	34,140.	ppb	0.48	200000.	
51 V	0.3401	0.3401	ppb	36.84	1000.	
52 Cr	0.3286	0.3286	ppb	5.13	1000.	
53 Cr	4.79	4.79	ppb	6.33	#VALUE!	
55 Mn	54.21	54.21	ppb	0.41	1000.	
56 Fe	157.7	157.7	ppb	1.91	#VALUE!	
57 Fe	209.2	209.2	ppb	0.60	100000.	
59 Co	0.3752	0.3752	ppb	1.81	1000.	
60 Ni	1.314	1.314	ppb	1.95	1000.	
63 Cu	2.45	2.45	ppb	2.27	#VALUE!	
65 Cu	2.099	2.099	ppb	1.64	1000.	
66 Zn	9.742	9.742	ppb	0.86	1000.	
68 Zn	9.471	9.471	ppb	2.98	#VALUE!	
75 As	1.179	1.179	ppb	14.93	1000.	
82 Se	0.2373	0.2373	ppb	34.83	1000.	
88 Sr	135.3	135.3	ppb	0.47	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.201	2.201	ppb	3.72	1000.	
107 Ag	0.0332	0.0332	ppb	26.49	500.	
109 Ag	0.0325	0.0325	ppb	7.33	#VALUE!	
111 Cd	-0.122	-0.122	ppb	31.28	#VALUE!	
114 Cd	0.0117	0.0117	ppb	26.95	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	1.215	1.215	ppb	0.69	1000.	
120 Sn	1.209	1.209	ppb	4.28	#VALUE!	
121 Sb	0.1357	0.1357	ppb	5.12	#VALUE!	
123 Sb	0.1442	0.1442	ppb	3.12	1000.	
135 Ba	7.452	7.452	ppb	4.93	1000.	
137 Ba	7.318	7.318	ppb	1.45	#VALUE!	
182 W	0.2422	0.2422	ppb ---		#VALUE!	
203 Tl	-0.0028	-0.0028	ppb	100.92	1000.	
205 Tl	0.0018	0.0018	ppb	82.23	#VALUE!	
208 Pb	0.192	0.192	ppb	5.96	1000.	
232 Th	0.1387	0.1387	ppb	10.83	1000.	
238 U	0.0218	0.0218	ppb	11.91	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2791596.50	0.34	3254874.00	85.8	69.5 - 130	
45 Sc	2550319.00	0.50	2845192.80	89.6	69.5 - 130	
72 Ge	575420.75	0.53	628164.81	91.6	69.5 - 130	
159 Tb	4741126.50	0.42	4911963.50	96.5	69.5 - 130	
209 Bi	2601785.00	1.45	2733046.80	95.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000124

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\065SMPL.D\065SMPL.D#
Date Acquired: Jul 23 2014 03:21 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-005
Misc Info: DILUTION 1.6/8
Vial Number: 2310
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	1.5835	0.3167	ppb	4.62	100.	
11 B	15.935	3.187	ppb	18.37	1000.	
23 Na	1,178.	235.6	ppb	4.54	200000.	
25 Mg	2,959.	591.8	ppb	0.72	200000.	
27 Al	457,650.	91,530.	ppb	0.60	200000.	
28 Si	21,155.	4,231.	ppb	2.84	#VALUE!	
29 Si	12,965.	2,593.	ppb	4.38	10000.	
39 K	2,543.5	508.7	ppb	0.81	200000.	
43 Ca	9,685.	1,937.	ppb	2.98	#VALUE!	
44 Ca	9,000.	1,800.	ppb	1.28	200000.	
51 V	1,019.	203.8	ppb	0.82	1000.	
52 Cr	220.5	44.1	ppb	0.68	1000.	
53 Cr	268.5	53.7	ppb	1.09	#VALUE!	
55 Mn	1,513.5	302.7	ppb	0.41	1000.	
56 Fe	360,250.	72,050.	ppb	0.69	#VALUE!	
57 Fe	345,900.	69,180.	ppb	0.38	100000.	
59 Co	37.865	7.573	ppb	0.47	1000.	
60 Ni	151.1	30.22	ppb	0.61	1000.	
63 Cu	262.25	52.45	ppb	0.37	#VALUE!	
65 Cu	263.25	52.65	ppb	0.42	1000.	
66 Zn	395.	79.	ppb	1.04	1000.	
68 Zn	422.3	84.46	ppb	1.03	#VALUE!	
75 As	24.69	4.938	ppb	3.01	1000.	
82 Se	0.5215	0.1043	ppb	47.85	1000.	
88 Sr	85.3	17.06	ppb	0.77	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	19.51	3.902	ppb	1.52	1000.	
107 Ag	0.6375	0.1275	ppb	9.20	500.	
109 Ag	0.2157	0.0431	ppb	24.11	#VALUE!	
111 Cd	2.928	0.5856	ppb	13.46	#VALUE!	
114 Cd	0.2957	0.0591	ppb	4.46	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	35.65	7.13	ppb	1.02	1000.	
120 Sn	35.81	7.162	ppb	0.13	#VALUE!	
121 Sb	1.281	0.2562	ppb	2.68	#VALUE!	
123 Sb	1.3	0.26	ppb	5.03	1000.	
135 Ba	1,477.5	295.5	ppb	0.81	1000.	
137 Ba	1,477.	295.4	ppb	0.17	#VALUE!	
182 W	0.6595	0.1319	ppb ---		#VALUE!	
203 Tl	2.3705	0.4741	ppb	5.95	1000.	
205 Tl	2.401	0.4802	ppb	4.02	#VALUE!	
208 Pb	136.1	27.22	ppb	0.71	1000.	
232 Th	81.65	16.33	ppb	1.05	1000.	
238 U	18.	3.6	ppb	0.51	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2940796.50	0.22	3254874.00	90.4	69.5 - 130	
45 Sc	2770507.00	0.92	2845192.80	97.4	69.5 - 130	
72 Ge	601152.69	0.89	628164.81	95.7	69.5 - 130	
159 Tb	4863535.50	0.30	4911963.50	99.0	69.5 - 130	
209 Bi	2660186.80	0.19	2733046.80	97.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000125

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\066SMPL.D\066SMPL.D#
Date Acquired: Jul 23 2014 03:25 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-005L
Misc Info: DILUTION 0.4/10
Vial Number: 2311
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	1.5825	0.0633	ppb	14.78	100.	
11 B	28.85	1.154	ppb	22.73	1000.	
23 Na	1,250.5	50.02	ppb	0.72	200000.	
25 Mg	3,155.	126.2	ppb	1.44	200000.	
27 Al	491,000.	19,640.	ppb	0.53	200000.	
28 Si	18,457.5	738.3	ppb	6.23	#VALUE!	
29 Si	8,117.5	324.7	ppb	42.93	10000.	
39 K	2,577.5	103.1	ppb	7.05	200000.	
43 Ca	10,047.5	401.9	ppb	6.60	#VALUE!	
44 Ca	9,575.	383.	ppb	3.31	200000.	
51 V	1,039.25	41.57	ppb	0.73	1000.	
52 Cr	228.575	9.143	ppb	1.30	1000.	
53 Cr	264.25	10.57	ppb	0.70	#VALUE!	
55 Mn	1,607.75	64.31	ppb	0.84	1000.	
56 Fe	375,000.	15,000.	ppb	0.73	#VALUE!	
57 Fe	368,250.	14,730.	ppb	0.15	100000.	
59 Co	39.075	1.563	ppb	1.25	1000.	
60 Ni	157.725	6.309	ppb	0.99	1000.	
63 Cu	274.	10.96	ppb	0.54	#VALUE!	
65 Cu	282.	11.28	ppb	0.92	1000.	
66 Zn	413.	16.52	ppb	0.82	1000.	
68 Zn	436.25	17.45	ppb	0.67	#VALUE!	
75 As	26.625	1.065	ppb	8.80	1000.	
82 Se	-8.855	-0.3542	ppb	24.37	1000.	
88 Sr	88.575	3.543	ppb	0.84	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	20.64	0.8256	ppb	1.20	1000.	
107 Ag	0.3973	0.0159	ppb	33.47	500.	
109 Ag	0.0749	0.003	ppb	47.80	#VALUE!	
111 Cd	1.2633	0.0505	ppb	46.61	#VALUE!	
114 Cd	0.409	0.0164	ppb	32.14	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	35.725	1.429	ppb	1.76	1000.	
120 Sn	36.275	1.451	ppb	1.78	#VALUE!	
121 Sb	1.2413	0.0497	ppb	5.94	#VALUE!	
123 Sb	1.3205	0.0528	ppb	16.63	1000.	
135 Ba	1,501.5	60.06	ppb	0.87	1000.	
137 Ba	1,501.75	60.07	ppb	0.64	#VALUE!	
182 W	1.2673	0.0507	ppb ---		#VALUE!	
203 Tl	1.956	0.0782	ppb	3.05	1000.	
205 Tl	2.3835	0.0953	ppb	5.16	#VALUE!	
208 Pb	136.875	5.475	ppb	0.91	1000.	
232 Th	78.55	3.142	ppb	1.48	1000.	
238 U	17.975	0.719	ppb	2.67	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2931438.80	0.89	3254874.00	90.1	69.5 - 130	
45 Sc	2620343.80	0.62	2845192.80	92.1	69.5 - 130	
72 Ge	585110.88	0.08	628164.81	93.1	69.5 - 130	
159 Tb	4869123.50	0.59	4911963.50	99.1	69.5 - 130	
209 Bi	2778918.00	0.96	2733046.80	101.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000126

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\067SMPL.D\067SMPL.D#
Date Acquired: Jul 23 2014 03:28 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-005A
Misc Info: DILUTION 1.6/8
Vial Number: 2312
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	11.105	2.221	ppb	0.60	100.	
11 B	192.2	38.44	ppb	0.81	1000.	
23 Na	10,235.	2,047.	ppb	0.98	200000.	
25 Mg	3,879.	775.8	ppb	0.37	200000.	
27 Al	463,600.	92,720.	ppb	0.49	200000.	
28 Si	25,575.	5,115.	ppb	2.17	#VALUE!	
29 Si	17,000.	3,400.	ppb	2.26	10000.	
39 K	11,740.	2,348.	ppb	0.40	200000.	
43 Ca	10,325.	2,065.	ppb	0.46	#VALUE!	
44 Ca	9,860.	1,972.	ppb	0.11	200000.	
51 V	1,068.5	213.7	ppb	0.52	1000.	
52 Cr	268.05	53.61	ppb	0.50	1000.	
53 Cr	316.5	63.3	ppb	0.43	#VALUE!	
55 Mn	1,538.	307.6	ppb	0.26	1000.	
56 Fe	362,700.	72,540.	ppb	0.41	#VALUE!	
57 Fe	346,400.	69,280.	ppb	0.55	100000.	
59 Co	46.515	9.303	ppb	0.66	1000.	
60 Ni	167.75	33.55	ppb	0.53	1000.	
63 Cu	287.5	57.5	ppb	0.31	#VALUE!	
65 Cu	290.65	58.13	ppb	0.19	1000.	
66 Zn	486.4	97.28	ppb	0.37	1000.	
68 Zn	508.	101.6	ppb	1.45	#VALUE!	
75 As	70.7	14.14	ppb	0.60	1000.	
82 Se	45.52	9.104	ppb	2.63	1000.	
88 Sr	131.6	26.32	ppb	0.44	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	67.25	13.45	ppb	0.30	1000.	
107 Ag	10.18	2.036	ppb	2.27	500.	
109 Ag	9.785	1.957	ppb	0.61	#VALUE!	
111 Cd	13.245	2.649	ppb	1.89	#VALUE!	
114 Cd	9.92	1.984	ppb	2.15	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	81.95	16.39	ppb	0.69	1000.	
120 Sn	81.8	16.36	ppb	0.33	#VALUE!	
121 Sb	10.76	2.152	ppb	1.91	#VALUE!	
123 Sb	10.84	2.168	ppb	2.54	1000.	
135 Ba	1,499.5	299.9	ppb	1.05	1000.	
137 Ba	1,500.5	300.1	ppb	1.00	#VALUE!	
182 W	50.05	10.01	ppb ---		#VALUE!	
203 Tl	11.69	2.338	ppb	2.54	1000.	
205 Tl	11.915	2.383	ppb	1.61	#VALUE!	
208 Pb	146.4	29.28	ppb	0.41	1000.	
232 Th	93.	18.6	ppb	0.35	1000.	
238 U	27.86	5.572	ppb	0.13	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2963637.80	0.37	3254874.00	91.1	69.5 - 130	
45 Sc	2713189.30	1.20	2845192.80	95.4	69.5 - 130	
72 Ge	586697.69	0.81	628164.81	93.4	69.5 - 130	
159 Tb	4785744.50	0.74	4911963.50	97.4	69.5 - 130	
209 Bi	2641194.00	1.38	2733046.80	96.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000127

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\068SMPL.D\068SMPL.D#
Date Acquired: Jul 23 2014 03:32 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-005S
Misc Info: DILUTION 1.6/8
Vial Number: 2401
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	49.495	9.899	ppb	1.12	100.	
11 B	337.15	67.43	ppb	2.71	1000.	
23 Na	7,995.	1,599.	ppb	0.58	200000.	
25 Mg	10,085.	2,017.	ppb	0.30	200000.	
27 Al	736,000.	147,200.	ppb	0.79	200000.	
28 Si	10,615.	2,123.	ppb	5.04	#VALUE!	
29 Si	4,627.5	925.5	ppb	6.40	10000.	
39 K	13,665.	2,733.	ppb	1.01	200000.	
43 Ca	14,570.	2,914.	ppb	3.95	#VALUE!	
44 Ca	13,435.	2,687.	ppb	0.27	200000.	
51 V	1,894.	378.8	ppb	0.89	1000.	
52 Cr	572.5	114.5	ppb	1.23	1000.	
53 Cr	598.	119.6	ppb	0.94	#VALUE!	
55 Mn	2,480.5	496.1	ppb	0.45	1000.	
56 Fe	504,000.	100,800.	ppb	0.33	#VALUE!	
57 Fe	480,400.	96,080.	ppb	0.67	100000.	
59 Co	519.5	103.9	ppb	2.07	1000.	
60 Ni	692.	138.4	ppb	0.68	1000.	
63 Cu	587.5	117.5	ppb	0.71	#VALUE!	
65 Cu	595.	119.	ppb	0.53	1000.	
66 Zn	1,148.5	229.7	ppb	0.75	1000.	
68 Zn	1,209.	241.8	ppb	0.12	#VALUE!	
75 As	117.05	23.41	ppb	0.97	1000.	
82 Se	77.3	15.46	ppb	1.04	1000.	
88 Sr	634.5	126.9	ppb	0.79	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	258.9	51.78	ppb	0.26	1000.	
107 Ag	47.295	9.459	ppb	0.98	500.	
109 Ag	46.855	9.371	ppb	0.97	#VALUE!	
111 Cd	229.6	45.92	ppb	0.54	#VALUE!	
114 Cd	224.65	44.93	ppb	0.89	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	466.1	93.22	ppb	1.85	1000.	
120 Sn	466.05	93.21	ppb	1.47	#VALUE!	
121 Sb	19.755	3.951	ppb	1.64	#VALUE!	
123 Sb	19.7	3.94	ppb	0.59	1000.	
135 Ba	3,937.	787.4	ppb	1.29	1000.	
137 Ba	3,995.	799.	ppb	1.38	#VALUE!	
182 W	21.435	4.287	ppb ---		#VALUE!	
203 Tl	100.45	20.09	ppb	0.87	1000.	
205 Tl	100.2	20.04	ppb	1.12	#VALUE!	
208 Pb	290.5	58.1	ppb	0.96	1000.	
232 Th	111.6	22.32	ppb	0.66	1000.	
238 U	121.1	24.22	ppb	0.18	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2980874.30	0.64	3254874.00	91.6	69.5 - 130	
45 Sc	2811328.00	1.42	2845192.80	98.8	69.5 - 130	
72 Ge	596523.56	1.59	628164.81	95.0	69.5 - 130	
159 Tb	4741384.50	0.86	4911963.50	96.5	69.5 - 130	
209 Bi	2583280.30	2.39	2733046.80	94.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000128

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\069SMPL.D\069SMPL.D#
Date Acquired: Jul 23 2014 03:35 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-005P
Misc Info: DILUTION 1.6/8
Vial Number: 2402
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	50.15	10.03	ppb	1.90	100.	
11 B	346.2	69.24	ppb	1.38	1000.	
23 Na	8,285.	1,657.	ppb	1.99	200000.	
25 Mg	10,110.	2,022.	ppb	2.42	200000.	
27 Al	722,500.	144,500.	ppb	1.53	200000.	
28 Si	10,315.	2,063.	ppb	7.42	#VALUE!	
29 Si	5,640.	1,128.	ppb	25.59	10000.	
39 K	13,660.	2,732.	ppb	1.69	200000.	
43 Ca	14,555.	2,911.	ppb	2.02	#VALUE!	
44 Ca	13,225.	2,645.	ppb	1.11	200000.	
51 V	1,855.5	371.1	ppb	1.70	1000.	
52 Cr	509.	101.8	ppb	2.13	1000.	
53 Cr	551.	110.2	ppb	1.97	#VALUE!	
55 Mn	2,365.5	473.1	ppb	1.96	1000.	
56 Fe	473,800.	94,760.	ppb	2.11	#VALUE!	
57 Fe	452,950.	90,590.	ppb	2.13	100000.	
59 Co	534.	106.8	ppb	1.57	1000.	
60 Ni	696.	139.2	ppb	2.37	1000.	
63 Cu	589.5	117.9	ppb	1.98	#VALUE!	
65 Cu	595.	119.	ppb	1.98	1000.	
66 Zn	1,101.5	220.3	ppb	1.93	1000.	
68 Zn	1,175.	235.	ppb	1.99	#VALUE!	
75 As	114.85	22.97	ppb	2.07	1000.	
82 Se	78.6	15.72	ppb	0.72	1000.	
88 Sr	642.5	128.5	ppb	1.91	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	270.4	54.08	ppb	2.45	1000.	
107 Ag	49.955	9.991	ppb	1.73	500.	
109 Ag	49.405	9.881	ppb	2.91	#VALUE!	
111 Cd	238.55	47.71	ppb	2.98	#VALUE!	
114 Cd	234.95	46.99	ppb	3.32	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	476.7	95.34	ppb	0.84	1000.	
120 Sn	478.15	95.63	ppb	1.15	#VALUE!	
121 Sb	20.565	4.113	ppb	0.47	#VALUE!	
123 Sb	20.565	4.113	ppb	1.81	1000.	
135 Ba	4,022.5	804.5	ppb	0.88	1000.	
137 Ba	4,108.5	821.7	ppb	0.91	#VALUE!	
182 W	24.865	4.973	ppb ---		#VALUE!	
203 Tl	103.15	20.63	ppb	2.46	1000.	
205 Tl	103.75	20.75	ppb	2.62	#VALUE!	
208 Pb	285.1	57.02	ppb	2.66	1000.	
232 Th	109.95	21.99	ppb	2.79	1000.	
238 U	123.	24.6	ppb	3.34	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2942896.50	1.81	3254874.00	90.4	69.5 - 130	
45 Sc	2708029.80	3.31	2845192.80	95.2	69.5 - 130	
72 Ge	574270.31	3.51	628164.81	91.4	69.5 - 130	
159 Tb	4686937.00	0.92	4911963.50	95.4	69.5 - 130	
209 Bi	2564017.30	1.10	2733046.80	93.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000129

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\070SMPL.D\070SMPL.D#
Date Acquired: Jul 23 2014 03:39 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-041
Misc Info: DILUTION 1.6/8
Vial Number: 2403
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.48	1.096	ppb	1.69	100.	
11 B	12.875	2.575	ppb	12.31	1000.	
23 Na	6,755.	1,351.	ppb	2.30	200000.	
25 Mg	19,455.	3,891.	ppb	2.63	200000.	
27 Al	292,850.	58,570.	ppb	2.32	200000.	
28 Si	7,145.	1,429.	ppb	8.61	#VALUE!	
29 Si	5,110.	1,022.	ppb	27.26	10000.	
39 K	3,931.5	786.3	ppb	2.72	200000.	
43 Ca	22,910.	4,582.	ppb	1.49	#VALUE!	
44 Ca	22,820.	4,564.	ppb	2.02	200000.	
51 V	802.	160.4	ppb	1.90	1000.	
52 Cr	130.55	26.11	ppb	1.36	1000.	
53 Cr	179.05	35.81	ppb	2.12	#VALUE!	
55 Mn	1,161.	232.2	ppb	1.92	1000.	
56 Fe	180,700.	36,140.	ppb	2.24	#VALUE!	
57 Fe	173,650.	34,730.	ppb	1.90	100000.	
59 Co	89.05	17.81	ppb	1.79	1000.	
60 Ni	196.6	39.32	ppb	1.47	1000.	
63 Cu	402.2	80.44	ppb	1.66	#VALUE!	
65 Cu	404.1	80.82	ppb	1.80	1000.	
66 Zn	522.	104.4	ppb	2.21	1000.	
68 Zn	565.5	113.1	ppb	2.38	#VALUE!	
75 As	14.365	2.873	ppb	3.23	1000.	
82 Se	0.2626	0.0525	ppb	658.80	1000.	
88 Sr	576.5	115.3	ppb	2.05	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	6.28	1.256	ppb	3.95	1000.	
107 Ag	1.137	0.2274	ppb	3.74	500.	
109 Ag	1.042	0.2084	ppb	1.46	#VALUE!	
111 Cd	3.943	0.7886	ppb	15.78	#VALUE!	
114 Cd	3.4525	0.6905	ppb	1.67	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	23.855	4.771	ppb	1.53	1000.	
120 Sn	24.23	4.846	ppb	1.88	#VALUE!	
121 Sb	0.6025	0.1205	ppb	5.39	#VALUE!	
123 Sb	0.625	0.125	ppb	6.92	1000.	
135 Ba	2,340.	468.	ppb	1.99	1000.	
137 Ba	2,345.5	469.1	ppb	2.25	#VALUE!	
182 W	0.5565	0.1113	ppb ---		#VALUE!	
203 Tl	1.233	0.2466	ppb	2.24	1000.	
205 Tl	1.3295	0.2659	ppb	3.44	#VALUE!	
208 Pb	73.1	14.62	ppb	2.23	1000.	
232 Th	24.025	4.805	ppb	6.19	1000.	
238 U	7.87	1.574	ppb	1.25	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2879713.00	1.37	3254874.00	88.5	69.5 - 130	
45 Sc	2579737.50	2.86	2845192.80	90.7	69.5 - 130	
72 Ge	560270.50	2.58	628164.81	89.2	69.5 - 130	
159 Tb	4793260.50	1.68	4911963.50	97.6	69.5 - 130	
209 Bi	2697029.00	1.10	2733046.80	98.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000130

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\071SMPL.D\071SMPL.D#
Date Acquired: Jul 23 2014 03:42 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-043
Misc Info: DILUTION 1.6/8
Vial Number: 2404
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.305	1.061	ppb	4.23	100.	
11 B	6.91	1.382	ppb	15.34	1000.	
23 Na	1,879.5	375.9	ppb	0.91	200000.	
25 Mg	11,295.	2,259.	ppb	1.67	200000.	
27 Al	235,750.	47,150.	ppb	1.55	200000.	
28 Si	14,485.	2,897.	ppb	2.77	#VALUE!	
29 Si	10,160.	2,032.	ppb	10.25	10000.	
39 K	7,090.	1,418.	ppb	1.80	200000.	
43 Ca	8,530.	1,706.	ppb	3.31	#VALUE!	
44 Ca	7,820.	1,564.	ppb	1.52	200000.	
51 V	1,080.	216.	ppb	1.36	1000.	
52 Cr	295.4	59.08	ppb	1.64	1000.	
53 Cr	339.85	67.97	ppb	1.89	#VALUE!	
55 Mn	1,273.5	254.7	ppb	1.33	1000.	
56 Fe	379,500.	75,900.	ppb	1.71	#VALUE!	
57 Fe	362,300.	72,460.	ppb	1.69	100000.	
59 Co	46.8	9.36	ppb	2.61	1000.	
60 Ni	189.55	37.91	ppb	2.15	1000.	
63 Cu	234.15	46.83	ppb	1.48	#VALUE!	
65 Cu	236.85	47.37	ppb	2.10	1000.	
66 Zn	830.	166.	ppb	1.42	1000.	
68 Zn	841.	168.2	ppb	1.90	#VALUE!	
75 As	43.105	8.621	ppb	3.46	1000.	
82 Se	-4.634	-0.9268	ppb	54.22	1000.	
88 Sr	455.95	91.19	ppb	1.17	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	23.855	4.771	ppb	1.90	1000.	
107 Ag	0.3247	0.0649	ppb	7.91	500.	
109 Ag	0.2293	0.0459	ppb	7.66	#VALUE!	
111 Cd	6.585	1.317	ppb	1.23	#VALUE!	
114 Cd	5.925	1.185	ppb	1.79	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	29.52	5.904	ppb	2.07	1000.	
120 Sn	29.565	5.913	ppb	1.09	#VALUE!	
121 Sb	3.1015	0.6203	ppb	3.90	#VALUE!	
123 Sb	3.019	0.6038	ppb	2.49	1000.	
135 Ba	1,129.5	225.9	ppb	1.64	1000.	
137 Ba	1,130.	226.	ppb	2.24	#VALUE!	
182 W	0.287	0.0574	ppb ---		#VALUE!	
203 Tl	2.328	0.4656	ppb	2.26	1000.	
205 Tl	2.3715	0.4743	ppb	1.11	#VALUE!	
208 Pb	203.05	40.61	ppb	1.36	1000.	
232 Th	79.55	15.91	ppb	0.56	1000.	
238 U	15.695	3.139	ppb	0.88	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2867635.30	0.87	3254874.00	88.1	69.5 - 130	
45 Sc	2558744.30	0.99	2845192.80	89.9	69.5 - 130	
72 Ge	551984.94	0.71	628164.81	87.9	69.5 - 130	
159 Tb	4735685.00	1.15	4911963.50	96.4	69.5 - 130	
209 Bi	2662571.80	0.70	2733046.80	97.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000131

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\072_CCV.D\072_CCV.D#
Date Acquired: Jul 23 2014 03:46 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.38	ppb	1.49	25	93.52	
11 B	23.82	ppb	0.92	25	95.28	
23 Na	4,873.	ppb	0.66	5,000	97.46	
25 Mg	4,914.	ppb	1.14	5,000	98.28	
27 Al	502.	ppb	0.92	500	100.4	
28 Si	317.5	ppb	14.60	500	63.5	
29 Si	223.3	ppb	36.34	500	44.66	Fail
39 K	4,867.	ppb	1.06	5,000	97.34	
43 Ca	4,942.	ppb	1.92	5,000	98.84	
44 Ca	4,997.	ppb	0.31	5,000	99.94	
51 V	23.66	ppb	0.92	25	94.64	
52 Cr	24.03	ppb	0.30	25	96.12	
53 Cr	23.17	ppb	0.39	25	92.68	
55 Mn	24.09	ppb	0.25	25	96.36	
56 Fe	4,849.	ppb	0.63	5,000	96.98	
57 Fe	4,917.	ppb	1.11	5,000	98.34	
59 Co	24.06	ppb	1.20	25	96.24	
60 Ni	23.98	ppb	0.92	25	95.92	
63 Cu	23.99	ppb	1.25	25	95.96	
65 Cu	24.02	ppb	0.77	25	96.08	
66 Zn	24.21	ppb	1.64	25	96.84	
68 Zn	24.41	ppb	3.25	25	97.64	
75 As	24.09	ppb	1.33	25	96.36	
82 Se	24.2	ppb	1.56	25	96.8	
88 Sr	24.89	ppb	0.39	25	99.56	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.04	ppb	0.95	25	100.16	
107 Ag	25.61	ppb	0.87	25	102.44	
109 Ag	25.59	ppb	0.81	25	102.36	
111 Cd	25.82	ppb	0.07	25	103.28	
114 Cd	25.9	ppb	1.20	25	103.6	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.46	ppb	0.62	25	93.84	
120 Sn	23.65	ppb	0.85	25	94.6	
121 Sb	23.59	ppb	0.30	25	94.36	
123 Sb	23.62	ppb	0.21	25	94.48	
135 Ba	23.87	ppb	0.94	25	95.48	
137 Ba	23.88	ppb	1.10	25	95.52	
182 W	24.89	ppb	1.03	25	99.56	
203 Tl	24.2	ppb	0.98	25	96.8	
205 Tl	24.27	ppb	0.80	25	97.08	
208 Pb	24.22	ppb	0.27	25	96.88	
232 Th	23.48	ppb	1.41	25	93.92	
238 U	23.97	ppb	1.17	25	95.88	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2852839.00	0.98	3254874.00	87.6	80 - 120.4	
45 Sc	2491145.50	0.31	2845192.80	87.6	80 - 120.4	
72 Ge	555892.44	0.88	628164.81	88.5	80 - 120.4	
159 Tb	4814793.50	1.22	4911963.50	98.0	80 - 120.4	
209 Bi	2754738.30	1.15	2733046.80	100.8	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000132

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\073_CCB.D\073_CCB.D#
Date Acquired: Jul 23 2014 03:49 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0042	ppb	61.17	1.00	
11 B	0.4966	ppb	35.04	1.00	
23 Na	4.612	ppb	11.30	1.00	
25 Mg	1.487	ppb	22.58	1.00	
27 Al	7.949	ppb	8.11	1.00	
28 Si	-37.72	ppb	300.11	1.00	
29 Si	122.8	ppb	84.69	1.00	Fail
39 K	6.717	ppb	48.44	1.00	
43 Ca	-1.21	ppb	397.93	1.00	
44 Ca	-8.561	ppb	32.95	1.00	
51 V	-0.0456	ppb	138.52	1.00	
52 Cr	-0.0198	ppb	24.51	1.00	
53 Cr	-0.7314	ppb	32.50	1.00	
55 Mn	0.061	ppb	5.59	1.00	
56 Fe	-9.018	ppb	86.05	1.00	
57 Fe	7.312	ppb	79.69	1.00	
59 Co	-0.0091	ppb	25.75	1.00	
60 Ni	0.0097	ppb	105.57	1.00	
63 Cu	-0.0207	ppb	27.76	1.00	
65 Cu	-0.0055	ppb	154.36	1.00	
66 Zn	0.0328	ppb	25.80	1.00	
68 Zn	0.1059	ppb	205.57	1.00	
75 As	-0.0257	ppb	370.40	1.00	
82 Se	-0.3429	ppb	48.35	1.00	
88 Sr	0.0235	ppb	6.43	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0669	ppb	4.51	1.00	
107 Ag	0.0001	ppb	1367.50	1.00	
109 Ag	0.0008	ppb	111.96	1.00	
111 Cd	-0.053	ppb	91.66	1.00	
114 Cd	0.0058	ppb	70.29	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0597	ppb	21.01	1.00	
120 Sn	0.0616	ppb	32.16	1.00	
121 Sb	0.0208	ppb	20.60	1.00	
123 Sb	0.0228	ppb	52.94	1.00	
135 Ba	0.0514	ppb	30.96	1.00	
137 Ba	0.0333	ppb	56.55	1.00	
182 W	0.0826	ppb	6.27	1.00	
203 Tl	0.0097	ppb	61.55	1.00	
205 Tl	0.0127	ppb	26.39	1.00	
208 Pb	0.0066	ppb	15.73	1.00	
232 Th	0.1906	ppb	13.47	1.00	
238 U	0.0078	ppb	35.56	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2847811.80	0.82	3254874.00	87.5	79.5 - 120	
45 Sc	2465518.30	0.20	2845192.80	86.7	79.5 - 120	
72 Ge	551312.94	0.61	628164.81	87.8	79.5 - 120	
159 Tb	4766613.00	0.99	4911963.50	97.0	79.5 - 120	
209 Bi	2746902.00	1.14	2733046.80	100.5	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000133

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\074SMPL.D\074SMPL.D#
Date Acquired: Jul 23 2014 03:53 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-045
Misc Info: DILUTION 1.6/8
Vial Number: 2405
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.376	0.8752	ppb	1.83	100.	
11 B	6.31	1.262	ppb	11.03	1000.	
23 Na	1,181.	236.2	ppb	0.78	200000.	
25 Mg	11,440.	2,288.	ppb	1.22	200000.	
27 Al	318,600.	63,720.	ppb	0.49	200000.	
28 Si	11,680.	2,336.	ppb	4.12	#VALUE!	
29 Si	7,470.	1,494.	ppb	3.29	10000.	
39 K	3,003.	600.6	ppb	0.71	200000.	
43 Ca	13,495.	2,699.	ppb	0.87	#VALUE!	
44 Ca	12,610.	2,522.	ppb	0.55	200000.	
51 V	587.5	117.5	ppb	0.65	1000.	
52 Cr	105.45	21.09	ppb	0.84	1000.	
53 Cr	157.6	31.52	ppb	2.06	#VALUE!	
55 Mn	3,104.5	620.9	ppb	0.77	1000.	
56 Fe	287,800.	57,560.	ppb	0.72	#VALUE!	
57 Fe	277,000.	55,400.	ppb	0.64	100000.	
59 Co	113.85	22.77	ppb	0.85	1000.	
60 Ni	92.8	18.56	ppb	1.25	1000.	
63 Cu	264.9	52.98	ppb	0.45	#VALUE!	
65 Cu	269.35	53.87	ppb	0.35	1000.	
66 Zn	526.5	105.3	ppb	1.12	1000.	
68 Zn	567.5	113.5	ppb	1.23	#VALUE!	
75 As	8.755	1.751	ppb	3.12	1000.	
82 Se	-1.9275	-0.3855	ppb	46.15	1000.	
88 Sr	371.2	74.24	ppb	0.76	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.679	0.7358	ppb	3.19	1000.	
107 Ag	0.76	0.152	ppb	5.63	500.	
109 Ag	0.579	0.1158	ppb	8.50	#VALUE!	
111 Cd	2.525	0.505	ppb	10.06	#VALUE!	
114 Cd	1.4205	0.2841	ppb	2.40	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.735	5.147	ppb	2.35	1000.	
120 Sn	25.625	5.125	ppb	1.36	#VALUE!	
121 Sb	0.2432	0.0486	ppb	14.68	#VALUE!	
123 Sb	0.2295	0.0459	ppb	1.29	1000.	
135 Ba	2,290.5	458.1	ppb	0.98	1000.	
137 Ba	2,296.5	459.3	ppb	0.98	#VALUE!	
182 W	0.691	0.1382	ppb ---		#VALUE!	
203 Tl	0.652	0.1304	ppb	5.24	1000.	
205 Tl	0.6465	0.1293	ppb	2.56	#VALUE!	
208 Pb	57.6	11.52	ppb	0.74	1000.	
232 Th	18.88	3.776	ppb	2.66	1000.	
238 U	5.435	1.087	ppb	0.79	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2929178.00	1.23	3254874.00	90.0	69.5 - 130	
45 Sc	2627794.80	1.51	2845192.80	92.4	69.5 - 130	
72 Ge	568823.25	1.61	628164.81	90.6	69.5 - 130	
159 Tb	4802951.50	0.42	4911963.50	97.8	69.5 - 130	
209 Bi	2708528.30	0.40	2733046.80	99.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000134

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\075SMPL.D\075SMPL.D#
Date Acquired: Jul 23 2014 03:56 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-047
Misc Info: DILUTION 1.6/8
Vial Number: 2406
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.056	0.8112	ppb	3.12	100.	
11 B	1.939	0.3878	ppb	16.54	1000.	
23 Na	1,109.	221.8	ppb	1.11	200000.	
25 Mg	10,890.	2,178.	ppb	1.58	200000.	
27 Al	31,520.	6,304.	ppb	1.51	200000.	
28 Si	4,655.5	931.1	ppb	4.41	#VALUE!	
29 Si	2,660.5	532.1	ppb	36.33	10000.	
39 K	10,070.	2,014.	ppb	1.56	200000.	
43 Ca	12,695.	2,539.	ppb	1.95	#VALUE!	
44 Ca	12,585.	2,517.	ppb	1.85	200000.	
51 V	61.85	12.37	ppb	0.82	1000.	
52 Cr	33.035	6.607	ppb	0.82	1000.	
53 Cr	90.35	18.07	ppb	1.70	#VALUE!	
55 Mn	1,349.	269.8	ppb	0.53	1000.	
56 Fe	63,900.	12,780.	ppb	1.19	#VALUE!	
57 Fe	62,900.	12,580.	ppb	0.61	100000.	
59 Co	16.76	3.352	ppb	1.15	1000.	
60 Ni	24.165	4.833	ppb	1.24	1000.	
63 Cu	23.165	4.633	ppb	2.01	#VALUE!	
65 Cu	24.285	4.857	ppb	1.54	1000.	
66 Zn	267.2	53.44	ppb	1.86	1000.	
68 Zn	265.8	53.16	ppb	0.76	#VALUE!	
75 As	7.035	1.407	ppb	5.45	1000.	
82 Se	-0.3581	-0.0716	ppb	285.30	1000.	
88 Sr	53.65	10.73	ppb	1.73	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.474	0.6948	ppb	4.54	1000.	
107 Ag	0.1024	0.0205	ppb	8.06	500.	
109 Ag	0.1421	0.0284	ppb	5.45	#VALUE!	
111 Cd	0.3566	0.0713	ppb	29.52	#VALUE!	
114 Cd	0.2601	0.052	ppb	7.09	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	28.91	5.782	ppb	0.40	1000.	
120 Sn	28.985	5.797	ppb	1.97	#VALUE!	
121 Sb	0.0728	0.0146	ppb	31.06	#VALUE!	
123 Sb	0.0943	0.0189	ppb	19.92	1000.	
135 Ba	139.7	27.94	ppb	1.90	1000.	
137 Ba	138.35	27.67	ppb	1.09	#VALUE!	
182 W	1.5225	0.3045	ppb ---		#VALUE!	
203 Tl	1.358	0.2716	ppb	5.76	1000.	
205 Tl	1.3415	0.2683	ppb	1.59	#VALUE!	
208 Pb	35.075	7.015	ppb	0.21	1000.	
232 Th	91.1	18.22	ppb	0.89	1000.	
238 U	50.75	10.15	ppb	1.46	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2928508.50	1.52	3254874.00	90.0	69.5 - 130	
45 Sc	2513971.80	1.60	2845192.80	88.4	69.5 - 130	
72 Ge	561866.38	0.80	628164.81	89.4	69.5 - 130	
159 Tb	4767036.00	1.05	4911963.50	97.0	69.5 - 130	
209 Bi	2736047.30	0.32	2733046.80	100.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000135

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\076SMPL.D\076SMPL.D#
Date Acquired: Jul 23 2014 04:00 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-051
Misc Info: DILUTION 1.6/8
Vial Number: 2407
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	1.2045	0.2409	ppb	9.26	100.	
11 B	4.3685	0.8737	ppb	1.35	1000.	
23 Na	425.	85.	ppb	1.49	200000.	
25 Mg	4,895.	979.	ppb	2.10	200000.	
27 Al	89,800.	17,960.	ppb	2.16	200000.	
28 Si	8,115.	1,623.	ppb	5.92	#VALUE!	
29 Si	4,946.5	989.3	ppb	17.50	10000.	
39 K	807.	161.4	ppb	5.58	200000.	
43 Ca	19,735.	3,947.	ppb	2.06	#VALUE!	
44 Ca	19,445.	3,889.	ppb	0.31	200000.	
51 V	191.35	38.27	ppb	1.04	1000.	
52 Cr	28.485	5.697	ppb	2.08	1000.	
53 Cr	77.85	15.57	ppb	0.98	#VALUE!	
55 Mn	230.	46.	ppb	0.87	1000.	
56 Fe	25,540.	5,108.	ppb	1.18	#VALUE!	
57 Fe	25,905.	5,181.	ppb	1.38	100000.	
59 Co	14.515	2.903	ppb	0.64	1000.	
60 Ni	36.005	7.201	ppb	2.79	1000.	
63 Cu	85.1	17.02	ppb	1.69	#VALUE!	
65 Cu	87.15	17.43	ppb	1.56	1000.	
66 Zn	93.7	18.74	ppb	1.39	1000.	
68 Zn	114.35	22.87	ppb	1.05	#VALUE!	
75 As	2.805	0.561	ppb	30.61	1000.	
82 Se	-0.1274	-0.0255	ppb	568.51	1000.	
88 Sr	327.8	65.56	ppb	0.74	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.5295	0.5059	ppb	3.84	1000.	
107 Ag	0.2414	0.0483	ppb	13.58	500.	
109 Ag	0.2028	0.0406	ppb	16.33	#VALUE!	
111 Cd	0.5895	0.1179	ppb	35.58	#VALUE!	
114 Cd	0.4322	0.0864	ppb	4.05	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	23.02	4.604	ppb	0.89	1000.	
120 Sn	23.18	4.636	ppb	2.31	#VALUE!	
121 Sb	0.1057	0.0211	ppb	35.34	#VALUE!	
123 Sb	0.1531	0.0306	ppb	20.57	1000.	
135 Ba	992.	198.4	ppb	0.71	1000.	
137 Ba	991.	198.2	ppb	1.08	#VALUE!	
182 W	0.2663	0.0533	ppb ---		#VALUE!	
203 Tl	0.4119	0.0824	ppb	10.58	1000.	
205 Tl	0.4221	0.0844	ppb	3.44	#VALUE!	
208 Pb	14.545	2.909	ppb	1.38	1000.	
232 Th	7.6	1.52	ppb	13.59	1000.	
238 U	1.6255	0.3251	ppb	1.95	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2961683.50	1.61	3254874.00	91.0	69.5 - 130	
45 Sc	2557375.00	1.75	2845192.80	89.9	69.5 - 130	
72 Ge	562383.75	0.95	628164.81	89.5	69.5 - 130	
159 Tb	4842219.50	1.07	4911963.50	98.6	69.5 - 130	
209 Bi	2799127.80	0.71	2733046.80	102.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000136

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\077SMPL.D\077SMPL.D#
Date Acquired: Jul 23 2014 04:03 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-053
Misc Info: DILUTION 1.6/8
Vial Number: 2408
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	7.295	1.459	ppb	1.59	100.	
11 B	8.8	1.76	ppb	6.11	1000.	
23 Na	25,840.	5,168.	ppb	1.07	200000.	
25 Mg	35,375.	7,075.	ppb	1.55	200000.	
27 Al	281,350.	56,270.	ppb	0.90	200000.	
28 Si	12,290.	2,458.	ppb	2.84	#VALUE!	
29 Si	7,065.	1,413.	ppb	4.48	10000.	
39 K	6,465.	1,293.	ppb	1.01	200000.	
43 Ca	134,600.	26,920.	ppb	1.14	#VALUE!	
44 Ca	127,250.	25,450.	ppb	1.41	200000.	
51 V	1,627.5	325.5	ppb	1.82	1000.	
52 Cr	424.2	84.84	ppb	1.56	1000.	
53 Cr	480.8	96.16	ppb	2.02	#VALUE!	
55 Mn	1,844.5	368.9	ppb	1.56	1000.	
56 Fe	381,900.	76,380.	ppb	1.63	#VALUE!	
57 Fe	364,700.	72,940.	ppb	1.53	100000.	
59 Co	209.05	41.81	ppb	1.69	1000.	
60 Ni	302.2	60.44	ppb	1.39	1000.	
63 Cu	628.	125.6	ppb	1.28	#VALUE!	
65 Cu	634.	126.8	ppb	1.39	1000.	
66 Zn	782.5	156.5	ppb	1.31	1000.	
68 Zn	796.5	159.3	ppb	1.60	#VALUE!	
75 As	6.105	1.221	ppb	3.68	1000.	
82 Se	0.746	0.1492	ppb	192.43	1000.	
88 Sr	2,382.5	476.5	ppb	1.43	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.181	0.4362	ppb	5.21	1000.	
107 Ag	1.032	0.2064	ppb	4.36	500.	
109 Ag	0.521	0.1042	ppb	8.02	#VALUE!	
111 Cd	5.215	1.043	ppb	0.75	#VALUE!	
114 Cd	0.9695	0.1939	ppb	2.99	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	29.705	5.941	ppb	1.56	1000.	
120 Sn	29.79	5.958	ppb	1.09	#VALUE!	
121 Sb	0.3589	0.0718	ppb	7.24	#VALUE!	
123 Sb	0.4006	0.0801	ppb	9.01	1000.	
135 Ba	1,518.5	303.7	ppb	1.29	1000.	
137 Ba	1,512.	302.4	ppb	1.04	#VALUE!	
182 W	0.4623	0.0925	ppb ---		#VALUE!	
203 Tl	1.2855	0.2571	ppb	7.76	1000.	
205 Tl	1.152	0.2304	ppb	8.97	#VALUE!	
208 Pb	60.1	12.02	ppb	2.09	1000.	
232 Th	45.47	9.094	ppb	2.29	1000.	
238 U	11.585	2.317	ppb	2.11	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2872110.80	1.33	3254874.00	88.2	69.5 - 130	
45 Sc	2687222.50	1.08	2845192.80	94.4	69.5 - 130	
72 Ge	577007.94	1.27	628164.81	91.9	69.5 - 130	
159 Tb	4755361.00	1.32	4911963.50	96.8	69.5 - 130	
209 Bi	2648007.50	2.43	2733046.80	96.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000137

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\078SMPL.D\078SMPL.D#
Date Acquired: Jul 23 2014 04:07 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-057
Misc Info: DILUTION 1.6/8
Vial Number: 2409
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.874	0.7748	ppb	4.79	100.	
11 B	6.8	1.36	ppb	1.81	1000.	
23 Na	4,106.5	821.3	ppb	0.37	200000.	
25 Mg	21,240.	4,248.	ppb	0.79	200000.	
27 Al	193,800.	38,760.	ppb	1.17	200000.	
28 Si	15,015.	3,003.	ppb	1.90	#VALUE!	
29 Si	8,455.	1,691.	ppb	2.73	10000.	
39 K	6,470.	1,294.	ppb	0.96	200000.	
43 Ca	25,730.	5,146.	ppb	1.78	#VALUE!	
44 Ca	25,495.	5,099.	ppb	0.36	200000.	
51 V	542.	108.4	ppb	1.18	1000.	
52 Cr	143.9	28.78	ppb	0.78	1000.	
53 Cr	195.3	39.06	ppb	2.33	#VALUE!	
55 Mn	1,510.5	302.1	ppb	0.95	1000.	
56 Fe	149,050.	29,810.	ppb	1.01	#VALUE!	
57 Fe	144,000.	28,800.	ppb	0.57	100000.	
59 Co	74.5	14.9	ppb	1.13	1000.	
60 Ni	116.65	23.33	ppb	1.11	1000.	
63 Cu	209.15	41.83	ppb	0.62	#VALUE!	
65 Cu	211.8	42.36	ppb	0.68	1000.	
66 Zn	469.35	93.87	ppb	0.46	1000.	
68 Zn	493.9	98.78	ppb	1.39	#VALUE!	
75 As	6.265	1.253	ppb	10.44	1000.	
82 Se	-2.136	-0.4272	ppb	45.53	1000.	
88 Sr	432.	86.4	ppb	0.63	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.908	0.5816	ppb	2.99	1000.	
107 Ag	0.2917	0.0583	ppb	14.95	500.	
109 Ag	0.2354	0.0471	ppb	3.06	#VALUE!	
111 Cd	1.094	0.2188	ppb	10.21	#VALUE!	
114 Cd	0.788	0.1576	ppb	3.49	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	26.58	5.316	ppb	1.04	1000.	
120 Sn	26.45	5.29	ppb	2.09	#VALUE!	
121 Sb	0.4306	0.0861	ppb	5.83	#VALUE!	
123 Sb	0.4691	0.0938	ppb	9.42	1000.	
135 Ba	1,625.	325.	ppb	1.04	1000.	
137 Ba	1,631.5	326.3	ppb	0.69	#VALUE!	
182 W	0.4849	0.097	ppb ---		#VALUE!	
203 Tl	1.4325	0.2865	ppb	6.11	1000.	
205 Tl	1.404	0.2808	ppb	1.29	#VALUE!	
208 Pb	71.	14.2	ppb	0.51	1000.	
232 Th	20.28	4.056	ppb	1.76	1000.	
238 U	7.365	1.473	ppb	0.98	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2934382.50	0.83	3254874.00	90.2	69.5 - 130	
45 Sc	2713952.50	0.83	2845192.80	95.4	69.5 - 130	
72 Ge	592737.19	0.64	628164.81	94.4	69.5 - 130	
159 Tb	4824502.00	0.46	4911963.50	98.2	69.5 - 130	
209 Bi	2687621.80	0.56	2733046.80	98.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000138

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\079SMPL.D\079SMPL.D#
Date Acquired: Jul 23 2014 04:10 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-059
Misc Info: DILUTION 1.6/8
Vial Number: 2410
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.625	1.125	ppb	2.74	100.	
11 B	4.9565	0.9913	ppb	10.56	1000.	
23 Na	4,728.5	945.7	ppb	0.30	200000.	
25 Mg	21,895.	4,379.	ppb	0.40	200000.	
27 Al	158,150.	31,630.	ppb	0.35	200000.	
28 Si	7,170.	1,434.	ppb	3.85	#VALUE!	
29 Si	4,618.	923.6	ppb	13.97	10000.	
39 K	5,900.	1,180.	ppb	0.64	200000.	
43 Ca	34,010.	6,802.	ppb	0.71	#VALUE!	
44 Ca	34,150.	6,830.	ppb	0.79	200000.	
51 V	614.	122.8	ppb	0.70	1000.	
52 Cr	134.2	26.84	ppb	0.60	1000.	
53 Cr	182.3	36.46	ppb	0.61	#VALUE!	
55 Mn	2,413.5	482.7	ppb	0.55	1000.	
56 Fe	211,550.	42,310.	ppb	0.53	#VALUE!	
57 Fe	202,350.	40,470.	ppb	0.35	100000.	
59 Co	89.45	17.89	ppb	0.76	1000.	
60 Ni	116.05	23.21	ppb	0.72	1000.	
63 Cu	207.	41.4	ppb	0.84	#VALUE!	
65 Cu	211.25	42.25	ppb	0.72	1000.	
66 Zn	464.25	92.85	ppb	0.50	1000.	
68 Zn	490.1	98.02	ppb	0.32	#VALUE!	
75 As	5.625	1.125	ppb	11.99	1000.	
82 Se	-1.1255	-0.2251	ppb	108.66	1000.	
88 Sr	522.5	104.5	ppb	0.78	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.1705	0.6341	ppb	1.77	1000.	
107 Ag	0.2512	0.0502	ppb	14.83	500.	
109 Ag	0.1894	0.0379	ppb	6.94	#VALUE!	
111 Cd	2.053	0.4106	ppb	7.96	#VALUE!	
114 Cd	1.268	0.2536	ppb	5.47	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	24.61	4.922	ppb	0.72	1000.	
120 Sn	24.695	4.939	ppb	0.17	#VALUE!	
121 Sb	0.3963	0.0793	ppb	7.92	#VALUE!	
123 Sb	0.3963	0.0793	ppb	11.10	1000.	
135 Ba	1,651.5	330.3	ppb	1.20	1000.	
137 Ba	1,652.	330.4	ppb	0.81	#VALUE!	
182 W	0.6755	0.1351	ppb ---		#VALUE!	
203 Tl	0.9115	0.1823	ppb	3.75	1000.	
205 Tl	0.939	0.1878	ppb	2.37	#VALUE!	
208 Pb	59.85	11.97	ppb	0.96	1000.	
232 Th	24.055	4.811	ppb	1.87	1000.	
238 U	8.385	1.677	ppb	0.72	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2920268.00	1.03	3254874.00	89.7	69.5 - 130	
45 Sc	2613086.80	1.05	2845192.80	91.8	69.5 - 130	
72 Ge	575137.19	0.73	628164.81	91.6	69.5 - 130	
159 Tb	4837991.00	0.61	4911963.50	98.5	69.5 - 130	
209 Bi	2722293.00	0.54	2733046.80	99.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000139

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\080SMPL.D\080SMPL.D#
Date Acquired: Jul 23 2014 04:14 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-061
Misc Info: DILUTION 1.6/8
Vial Number: 2411
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.608	0.7216	ppb	1.62	100.	
11 B	6.435	1.287	ppb	5.45	1000.	
23 Na	1,910.5	382.1	ppb	1.02	200000.	
25 Mg	14,950.	2,990.	ppb	0.76	200000.	
27 Al	264,100.	52,820.	ppb	0.45	200000.	
28 Si	15,375.	3,075.	ppb	2.49	#VALUE!	
29 Si	11,650.	2,330.	ppb	11.28	10000.	
39 K	3,198.5	639.7	ppb	1.30	200000.	
43 Ca	10,530.	2,106.	ppb	1.65	#VALUE!	
44 Ca	9,775.	1,955.	ppb	1.02	200000.	
51 V	542.	108.4	ppb	2.01	1000.	
52 Cr	107.25	21.45	ppb	1.27	1000.	
53 Cr	168.95	33.79	ppb	1.62	#VALUE!	
55 Mn	1,875.5	375.1	ppb	0.94	1000.	
56 Fe	141,450.	28,290.	ppb	1.08	#VALUE!	
57 Fe	136,050.	27,210.	ppb	1.10	100000.	
59 Co	61.85	12.37	ppb	1.16	1000.	
60 Ni	152.95	30.59	ppb	0.97	1000.	
63 Cu	184.3	36.86	ppb	1.19	#VALUE!	
65 Cu	188.45	37.69	ppb	0.20	1000.	
66 Zn	384.7	76.94	ppb	0.96	1000.	
68 Zn	417.	83.4	ppb	1.09	#VALUE!	
75 As	4.243	0.8486	ppb	24.32	1000.	
82 Se	-6.165	-1.233	ppb	29.03	1000.	LOW
88 Sr	292.65	58.53	ppb	0.97	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.0165	0.6033	ppb	4.97	1000.	
107 Ag	0.3927	0.0785	ppb	8.88	500.	
109 Ag	0.3394	0.0679	ppb	19.24	#VALUE!	
111 Cd	2.4375	0.4875	ppb	21.44	#VALUE!	
114 Cd	1.435	0.287	ppb	1.43	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	24.215	4.843	ppb	2.27	1000.	
120 Sn	24.625	4.925	ppb	1.77	#VALUE!	
121 Sb	0.3473	0.0695	ppb	18.18	#VALUE!	
123 Sb	0.3499	0.07	ppb	17.61	1000.	
135 Ba	1,701.	340.2	ppb	1.06	1000.	
137 Ba	1,710.5	342.1	ppb	1.23	#VALUE!	
182 W	0.3499	0.07	ppb ---		#VALUE!	
203 Tl	1.007	0.2014	ppb	1.39	1000.	
205 Tl	1.0895	0.2179	ppb	2.70	#VALUE!	
208 Pb	86.75	17.35	ppb	1.68	1000.	
232 Th	18.64	3.728	ppb	1.80	1000.	
238 U	6.365	1.273	ppb	3.51	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2871477.00	1.14	3254874.00	88.2	69.5 - 130	
45 Sc	2514991.00	1.56	2845192.80	88.4	69.5 - 130	
72 Ge	548313.06	1.72	628164.81	87.3	69.5 - 130	
159 Tb	4767068.50	1.18	4911963.50	97.1	69.5 - 130	
209 Bi	2707382.50	1.38	2733046.80	99.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000140

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\081SMPL.D\081SMPL.D#
Date Acquired: Jul 23 2014 04:17 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-063
Misc Info: DILUTION 1.6/8
Vial Number: 2412
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.4075	0.8815	ppb	1.54	100.	
11 B	7.195	1.439	ppb	5.66	1000.	
23 Na	9,945.	1,989.	ppb	0.66	200000.	
25 Mg	18,115.	3,623.	ppb	0.56	200000.	
27 Al	282,050.	56,410.	ppb	0.87	200000.	
28 Si	14,525.	2,905.	ppb	1.39	#VALUE!	
29 Si	9,390.	1,878.	ppb	1.70	10000.	
39 K	4,567.	913.4	ppb	0.89	200000.	
43 Ca	56,550.	11,310.	ppb	1.00	#VALUE!	
44 Ca	55,350.	11,070.	ppb	0.87	200000.	
51 V	802.	160.4	ppb	0.83	1000.	
52 Cr	115.05	23.01	ppb	0.83	1000.	
53 Cr	167.95	33.59	ppb	1.46	#VALUE!	
55 Mn	1,140.	228.	ppb	0.77	1000.	
56 Fe	143,700.	28,740.	ppb	0.45	#VALUE!	
57 Fe	138,800.	27,760.	ppb	0.60	100000.	
59 Co	105.2	21.04	ppb	1.67	1000.	
60 Ni	117.8	23.56	ppb	0.72	1000.	
63 Cu	387.35	77.47	ppb	0.17	#VALUE!	
65 Cu	391.9	78.38	ppb	0.79	1000.	
66 Zn	495.9	99.18	ppb	0.47	1000.	
68 Zn	584.	116.8	ppb	0.40	#VALUE!	
75 As	13.015	2.603	ppb	8.43	1000.	
82 Se	0.5075	0.1015	ppb	31.76	1000.	
88 Sr	943.5	188.7	ppb	0.51	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.75	1.15	ppb	0.89	1000.	
107 Ag	0.6645	0.1329	ppb	6.77	500.	
109 Ag	0.5195	0.1039	ppb	4.37	#VALUE!	
111 Cd	3.134	0.6268	ppb	4.04	#VALUE!	
114 Cd	1.5495	0.3099	ppb	1.59	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.56	5.112	ppb	2.32	1000.	
120 Sn	25.86	5.172	ppb	0.73	#VALUE!	
121 Sb	0.273	0.0546	ppb	9.62	#VALUE!	
123 Sb	0.3022	0.0604	ppb	8.96	1000.	
135 Ba	4,388.5	877.7	ppb	0.73	1000.	
137 Ba	4,419.	883.8	ppb	0.85	#VALUE!	
182 W	0.5045	0.1009	ppb ---		#VALUE!	
203 Tl	1.1045	0.2209	ppb	7.87	1000.	
205 Tl	1.1985	0.2397	ppb	6.69	#VALUE!	
208 Pb	53.25	10.65	ppb	0.08	1000.	
232 Th	21.13	4.226	ppb	2.15	1000.	
238 U	7.515	1.503	ppb	1.37	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2907519.00	0.86	3254874.00	89.3	69.5 - 130	
45 Sc	2642204.80	0.87	2845192.80	92.9	69.5 - 130	
72 Ge	570658.63	1.51	628164.81	90.8	69.5 - 130	
159 Tb	4792106.00	0.26	4911963.50	97.6	69.5 - 130	
209 Bi	2720190.00	0.11	2733046.80	99.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000141

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\082SMPL.D\082SMPL.D#
Date Acquired: Jul 23 2014 04:21 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-065
Misc Info: DILUTION 1.6/8
Vial Number: 2501
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.1955	0.6391	ppb	0.22	100.	
11 B	7.69	1.538	ppb	5.35	1000.	
23 Na	862.5	172.5	ppb	0.89	200000.	
25 Mg	12,150.	2,430.	ppb	0.30	200000.	
27 Al	232,700.	46,540.	ppb	0.33	200000.	
28 Si	13,320.	2,664.	ppb	2.36	#VALUE!	
29 Si	7,615.	1,523.	ppb	11.50	10000.	
39 K	2,503.5	500.7	ppb	0.36	200000.	
43 Ca	23,995.	4,799.	ppb	0.99	#VALUE!	
44 Ca	23,835.	4,767.	ppb	0.42	200000.	
51 V	489.75	97.95	ppb	1.01	1000.	
52 Cr	101.15	20.23	ppb	0.32	1000.	
53 Cr	153.75	30.75	ppb	1.11	#VALUE!	
55 Mn	770.5	154.1	ppb	0.29	1000.	
56 Fe	102,700.	20,540.	ppb	0.38	#VALUE!	
57 Fe	99,500.	19,900.	ppb	0.23	100000.	
59 Co	54.85	10.97	ppb	1.32	1000.	
60 Ni	70.15	14.03	ppb	0.80	1000.	
63 Cu	205.6	41.12	ppb	0.46	#VALUE!	
65 Cu	209.25	41.85	ppb	0.78	1000.	
66 Zn	280.75	56.15	ppb	0.93	1000.	
68 Zn	348.	69.6	ppb	0.70	#VALUE!	
75 As	7.565	1.513	ppb	7.21	1000.	
82 Se	-0.6435	-0.1287	ppb	270.47	1000.	
88 Sr	399.35	79.87	ppb	1.58	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.19	1.038	ppb	3.51	1000.	
107 Ag	0.5175	0.1035	ppb	0.59	500.	
109 Ag	0.375	0.075	ppb	8.93	#VALUE!	
111 Cd	1.2325	0.2465	ppb	24.77	#VALUE!	
114 Cd	0.8575	0.1715	ppb	4.22	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	24.715	4.943	ppb	2.14	1000.	
120 Sn	24.16	4.832	ppb	1.23	#VALUE!	
121 Sb	0.2517	0.0503	ppb	8.20	#VALUE!	
123 Sb	0.2377	0.0475	ppb	23.80	1000.	
135 Ba	2,997.5	599.5	ppb	0.83	1000.	
137 Ba	3,032.5	606.5	ppb	1.97	#VALUE!	
182 W	1.2815	0.2563	ppb ---		#VALUE!	
203 Tl	0.6405	0.1281	ppb	1.85	1000.	
205 Tl	0.656	0.1312	ppb	3.56	#VALUE!	
208 Pb	49.265	9.853	ppb	0.67	1000.	
232 Th	14.055	2.811	ppb	2.51	1000.	
238 U	4.972	0.9944	ppb	1.55	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2973225.30	0.57	3254874.00	91.3	69.5 - 130	
45 Sc	2723059.80	0.52	2845192.80	95.7	69.5 - 130	
72 Ge	592443.38	0.43	628164.81	94.3	69.5 - 130	
159 Tb	4893306.00	0.67	4911963.50	99.6	69.5 - 130	
209 Bi	2719448.80	0.36	2733046.80	99.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000142

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\083SMPL.D\083SMPL.D#
Date Acquired: Jul 23 2014 04:24 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-067
Misc Info: DILUTION 1.6/8
Vial Number: 2502
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.0915	0.6183	ppb	2.75	100.	
11 B	8.12	1.624	ppb	6.86	1000.	
23 Na	656.	131.2	ppb	2.24	200000.	
25 Mg	7,815.	1,563.	ppb	1.29	200000.	
27 Al	223,400.	44,680.	ppb	0.76	200000.	
28 Si	14,165.	2,833.	ppb	1.98	#VALUE!	
29 Si	7,560.	1,512.	ppb	6.26	10000.	
39 K	1,543.5	308.7	ppb	2.21	200000.	
43 Ca	18,150.	3,630.	ppb	1.45	#VALUE!	
44 Ca	17,505.	3,501.	ppb	1.08	200000.	
51 V	440.5	88.1	ppb	0.45	1000.	
52 Cr	74.65	14.93	ppb	0.85	1000.	
53 Cr	126.55	25.31	ppb	0.66	#VALUE!	
55 Mn	507.	101.4	ppb	1.41	1000.	
56 Fe	82,850.	16,570.	ppb	1.07	#VALUE!	
57 Fe	80,950.	16,190.	ppb	1.12	100000.	
59 Co	41.105	8.221	ppb	2.33	1000.	
60 Ni	66.55	13.31	ppb	0.43	1000.	
63 Cu	195.8	39.16	ppb	1.16	#VALUE!	
65 Cu	197.5	39.5	ppb	0.87	1000.	
66 Zn	232.	46.4	ppb	0.14	1000.	
68 Zn	268.05	53.61	ppb	2.44	#VALUE!	
75 As	4.4345	0.8869	ppb	22.55	1000.	
82 Se	-1.7015	-0.3403	ppb	67.18	1000.	
88 Sr	379.25	75.85	ppb	0.63	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.291	0.6582	ppb	2.96	1000.	
107 Ag	0.4478	0.0896	ppb	14.30	500.	
109 Ag	0.3367	0.0673	ppb	19.16	#VALUE!	
111 Cd	1.095	0.219	ppb	20.65	#VALUE!	
114 Cd	0.8705	0.1741	ppb	9.40	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	23.415	4.683	ppb	1.10	1000.	
120 Sn	23.415	4.683	ppb	0.05	#VALUE!	
121 Sb	0.2229	0.0446	ppb	7.49	#VALUE!	
123 Sb	0.2366	0.0473	ppb	6.45	1000.	
135 Ba	1,775.	355.	ppb	1.52	1000.	
137 Ba	1,777.	355.4	ppb	1.73	#VALUE!	
182 W	0.2935	0.0587	ppb ---		#VALUE!	
203 Tl	0.7675	0.1535	ppb	10.44	1000.	
205 Tl	0.825	0.165	ppb	6.70	#VALUE!	
208 Pb	33.32	6.664	ppb	1.23	1000.	
232 Th	11.315	2.263	ppb	4.66	1000.	
238 U	3.932	0.7864	ppb	2.89	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2989871.00	0.94	3254874.00	91.9	69.5 - 130	
45 Sc	2742833.00	0.72	2845192.80	96.4	69.5 - 130	
72 Ge	597970.69	0.61	628164.81	95.2	69.5 - 130	
159 Tb	4869591.00	0.62	4911963.50	99.1	69.5 - 130	
209 Bi	2730661.50	0.71	2733046.80	99.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000143

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\084_CCV.D\084_CCV.D#
Date Acquired: Jul 23 2014 04:28 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	24.59	ppb	2.34	25	98.36	
11 B	24.74	ppb	2.63	25	98.96	
23 Na	4,832.	ppb	1.79	5,000	96.64	
25 Mg	4,901.	ppb	2.03	5,000	98.02	
27 Al	509.9	ppb	1.58	500	101.98	
28 Si	196.8	ppb	89.43	500	39.36	
29 Si	-398.4	ppb	47.84	500	-79.68	Fail
39 K	4,936.	ppb	2.32	5,000	98.72	
43 Ca	4,989.	ppb	1.54	5,000	99.78	
44 Ca	5,064.	ppb	2.74	5,000	101.28	
51 V	24.32	ppb	2.95	25	97.28	
52 Cr	24.51	ppb	2.87	25	98.04	
53 Cr	23.82	ppb	2.30	25	95.28	
55 Mn	24.49	ppb	2.37	25	97.96	
56 Fe	4,935.	ppb	2.67	5,000	98.7	
57 Fe	4,990.	ppb	3.12	5,000	99.8	
59 Co	24.56	ppb	2.97	25	98.24	
60 Ni	24.48	ppb	3.21	25	97.92	
63 Cu	24.65	ppb	3.43	25	98.6	
65 Cu	24.75	ppb	2.05	25	99	
66 Zn	24.54	ppb	3.93	25	98.16	
68 Zn	24.83	ppb	2.59	25	99.32	
75 As	24.54	ppb	3.16	25	98.16	
82 Se	24.52	ppb	0.77	25	98.08	
88 Sr	24.73	ppb	3.10	25	98.92	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.98	ppb	2.78	25	99.92	
107 Ag	25.45	ppb	3.01	25	101.8	
109 Ag	25.38	ppb	4.04	25	101.52	
111 Cd	25.19	ppb	2.16	25	100.76	
114 Cd	25.32	ppb	3.34	25	101.28	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.65	ppb	2.73	25	98.6	
120 Sn	24.76	ppb	2.77	25	99.04	
121 Sb	24.75	ppb	2.05	25	99	
123 Sb	24.67	ppb	3.80	25	98.68	
135 Ba	24.4	ppb	3.25	25	97.6	
137 Ba	24.52	ppb	3.36	25	98.08	
182 W	24.76	ppb	3.43	25	99.04	
203 Tl	24.39	ppb	3.93	25	97.56	
205 Tl	24.44	ppb	3.80	25	97.76	
208 Pb	24.49	ppb	3.28	25	97.96	
232 Th	23.19	ppb	2.50	25	92.76	
238 U	24.09	ppb	3.76	25	96.36	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2869599.80	1.78	3254874.00	88.2	80 - 120.4	
45 Sc	2663427.50	1.57	2845192.80	93.6	80 - 120.4	
72 Ge	593999.44	1.97	628164.81	94.6	80 - 120.4	
159 Tb	4774941.00	1.01	4911963.50	97.2	80 - 120.4	
209 Bi	2683871.50	1.65	2733046.80	98.2	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000144

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\085_CCB.D\085_CCB.D#
Date Acquired: Jul 23 2014 04:31 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0055	ppb	38.65	1.00	
11 B	0.3302	ppb	30.25	1.00	
23 Na	0.1854	ppb	90.67	1.00	
25 Mg	0.7507	ppb	23.15	1.00	
27 Al	6.	ppb	9.82	1.00	
28 Si	-314.7	ppb	17.88	1.00	
29 Si	-587.3	ppb	5.98	1.00	Fail-DoD
39 K	-14.01	ppb	11.97	1.00	
43 Ca	1.111	ppb	440.41	1.00	
44 Ca	-9.481	ppb	26.17	1.00	
51 V	0.0125	ppb	456.31	1.00	
52 Cr	-0.0309	ppb	13.21	1.00	
53 Cr	-0.5651	ppb	19.38	1.00	
55 Mn	0.0453	ppb	31.57	1.00	
56 Fe	0.462	ppb	271.00	1.00	
57 Fe	-0.4574	ppb	728.68	1.00	
59 Co	-0.0189	ppb	31.70	1.00	
60 Ni	0.0049	ppb	235.11	1.00	
63 Cu	-0.0661	ppb	5.59	1.00	
65 Cu	-0.0507	ppb	10.09	1.00	
66 Zn	0.5454	ppb	13.91	1.00	
68 Zn	0.6578	ppb	3.45	1.00	
75 As	0.0618	ppb	168.96	1.00	
82 Se	-0.1241	ppb	147.78	1.00	
88 Sr	0.0193	ppb	15.01	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0941	ppb	99.04	1.00	
107 Ag	-0.0038	ppb	27.83	1.00	
109 Ag	-0.0009	ppb	341.34	1.00	
111 Cd	-0.1268	ppb	21.83	1.00	
114 Cd	0.002	ppb	116.00	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0557	ppb	17.12	1.00	
120 Sn	0.0513	ppb	13.84	1.00	
121 Sb	0.0163	ppb	33.73	1.00	
123 Sb	0.02	ppb	23.12	1.00	
135 Ba	0.0537	ppb	23.35	1.00	
137 Ba	0.0473	ppb	66.35	1.00	
182 W	0.0727	ppb	14.44	1.00	
203 Tl	0.0038	ppb	10.88	1.00	
205 Tl	0.0073	ppb	26.77	1.00	
208 Pb	-0.0019	ppb	31.65	1.00	
232 Th	0.1558	ppb	5.50	1.00	
238 U	0.0039	ppb	37.52	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2903997.50	1.30	3254874.00	89.2	79.5 - 120	
45 Sc	2632849.30	0.75	2845192.80	92.5	79.5 - 120	
72 Ge	582226.69	1.30	628164.81	92.7	79.5 - 120	
159 Tb	4802111.50	0.61	4911963.50	97.8	79.5 - 120	
209 Bi	2719556.80	0.97	2733046.80	99.5	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000145

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\086SMPL.D\086SMPL.D#
Date Acquired: Jul 23 2014 04:35 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-069
Misc Info: DILUTION 1.6/8
Vial Number: 2503
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.84	0.968	ppb	1.18	100.	
11 B	6.455	1.291	ppb	8.89	1000.	
23 Na	1,974.5	394.9	ppb	2.30	200000.	
25 Mg	23,290.	4,658.	ppb	2.18	200000.	
27 Al	300,950.	60,190.	ppb	2.36	200000.	
28 Si	16,665.	3,333.	ppb	4.67	#VALUE!	
29 Si	9,235.	1,847.	ppb	15.90	10000.	
39 K	4,970.5	994.1	ppb	2.94	200000.	
43 Ca	17,475.	3,495.	ppb	3.12	#VALUE!	
44 Ca	16,440.	3,288.	ppb	1.29	200000.	
51 V	677.	135.4	ppb	2.00	1000.	
52 Cr	154.8	30.96	ppb	1.84	1000.	
53 Cr	209.3	41.86	ppb	2.58	#VALUE!	
55 Mn	3,580.	716.	ppb	2.41	1000.	
56 Fe	213,400.	42,680.	ppb	2.12	#VALUE!	
57 Fe	203,800.	40,760.	ppb	2.67	100000.	
59 Co	129.1	25.82	ppb	2.06	1000.	
60 Ni	143.1	28.62	ppb	1.53	1000.	
63 Cu	217.	43.4	ppb	2.44	#VALUE!	
65 Cu	220.25	44.05	ppb	1.22	1000.	
66 Zn	471.6	94.32	ppb	2.83	1000.	
68 Zn	515.5	103.1	ppb	2.62	#VALUE!	
75 As	14.01	2.802	ppb	7.77	1000.	
82 Se	-4.35	-0.87	ppb	20.10	1000.	
88 Sr	421.75	84.35	ppb	1.24	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.635	1.127	ppb	2.57	1000.	
107 Ag	0.4794	0.0959	ppb	8.43	500.	
109 Ag	0.3638	0.0728	ppb	5.84	#VALUE!	
111 Cd	4.1425	0.8285	ppb	3.07	#VALUE!	
114 Cd	3.6645	0.7329	ppb	3.09	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.53	5.106	ppb	1.32	1000.	
120 Sn	25.54	5.108	ppb	0.92	#VALUE!	
121 Sb	0.3977	0.0795	ppb	1.49	#VALUE!	
123 Sb	0.4027	0.0805	ppb	5.83	1000.	
135 Ba	2,181.5	436.3	ppb	1.42	1000.	
137 Ba	2,179.5	435.9	ppb	1.43	#VALUE!	
182 W	0.6695	0.1339	ppb ---		#VALUE!	
203 Tl	2.0795	0.4159	ppb	4.06	1000.	
205 Tl	2.051	0.4102	ppb	1.23	#VALUE!	
208 Pb	72.75	14.55	ppb	1.84	1000.	
232 Th	28.	5.6	ppb	5.02	1000.	
238 U	10.69	2.138	ppb	2.33	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2919719.30	0.43	3254874.00	89.7	69.5 - 130	
45 Sc	2692169.30	2.02	2845192.80	94.6	69.5 - 130	
72 Ge	580697.56	1.82	628164.81	92.4	69.5 - 130	
159 Tb	4759398.50	1.12	4911963.50	96.9	69.5 - 130	
209 Bi	2656004.50	1.05	2733046.80	97.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000146

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\087SMPL.D\087SMPL.D#
Date Acquired: Jul 23 2014 04:39 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4736-071
Misc Info: DILUTION 1.6/8
Vial Number: 2504
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	2.4085	0.4817	ppb	2.68	100.	
11 B	5.95	1.19	ppb	11.72	1000.	
23 Na	4,381.	876.2	ppb	1.23	200000.	
25 Mg	13,245.	2,649.	ppb	1.84	200000.	
27 Al	113,450.	22,690.	ppb	1.91	200000.	
28 Si	11,305.	2,261.	ppb	5.40	#VALUE!	
29 Si	7,095.	1,419.	ppb	15.95	10000.	
39 K	3,854.5	770.9	ppb	2.41	200000.	
43 Ca	25,630.	5,126.	ppb	2.90	#VALUE!	
44 Ca	25,505.	5,101.	ppb	1.75	200000.	
51 V	493.2	98.64	ppb	0.90	1000.	
52 Cr	101.6	20.32	ppb	1.67	1000.	
53 Cr	154.2	30.84	ppb	2.18	#VALUE!	
55 Mn	750.5	150.1	ppb	1.72	1000.	
56 Fe	100,100.	20,020.	ppb	1.57	#VALUE!	
57 Fe	97,200.	19,440.	ppb	1.68	100000.	
59 Co	50.2	10.04	ppb	1.55	1000.	
60 Ni	98.4	19.68	ppb	2.05	1000.	
63 Cu	126.65	25.33	ppb	1.92	#VALUE!	
65 Cu	128.35	25.67	ppb	1.73	1000.	
66 Zn	322.05	64.41	ppb	1.66	1000.	
68 Zn	336.55	67.31	ppb	0.90	#VALUE!	
75 As	3.6445	0.7289	ppb	17.34	1000.	
82 Se	-1.734	-0.3468	ppb	45.21	1000.	
88 Sr	361.05	72.21	ppb	2.19	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	4.044	0.8088	ppb	2.21	1000.	
107 Ag	0.2448	0.049	ppb	13.34	500.	
109 Ag	0.1662	0.0332	ppb	13.13	#VALUE!	
111 Cd	0.926	0.1852	ppb	17.77	#VALUE!	
114 Cd	0.7275	0.1455	ppb	4.30	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	23.29	4.658	ppb	2.66	1000.	
120 Sn	23.33	4.666	ppb	2.24	#VALUE!	
121 Sb	0.2054	0.0411	ppb	28.72	#VALUE!	
123 Sb	0.2488	0.0498	ppb	7.35	1000.	
135 Ba	877.5	175.5	ppb	1.85	1000.	
137 Ba	876.	175.2	ppb	1.28	#VALUE!	
182 W	0.539	0.1078	ppb ---		#VALUE!	
203 Tl	0.6785	0.1357	ppb	2.83	1000.	
205 Tl	0.7075	0.1415	ppb	4.34	#VALUE!	
208 Pb	39.12	7.824	ppb	1.32	1000.	
232 Th	13.775	2.755	ppb	0.95	1000.	
238 U	4.4935	0.8987	ppb	1.75	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2891121.30	1.06	3254874.00	88.8	69.5 - 130	
45 Sc	2541041.30	1.00	2845192.80	89.3	69.5 - 130	
72 Ge	560154.50	0.86	628164.81	89.2	69.5 - 130	
159 Tb	4766713.50	1.38	4911963.50	97.0	69.5 - 130	
209 Bi	2721785.00	1.35	2733046.80	99.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000147

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\088SMPL.D\088SMPL.D#
Date Acquired: Jul 23 2014 04:42 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5280-001
Misc Info:
Vial Number: 2505
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0048	0.0048	ppb	28.97	100.	
11 B	65.29	65.29	ppb	0.65	1000.	
23 Na	69,720.	69,720.	ppb	1.49	200000.	
25 Mg	4,396.	4,396.	ppb	1.54	200000.	
27 Al	36.11	36.11	ppb	1.36	200000.	
28 Si	3,019.	3,019.	ppb	1.49	#VALUE!	
29 Si	2,070.	2,070.	ppb	6.63	10000.	
39 K	6,691.	6,691.	ppb	1.02	200000.	
43 Ca	37,780.	37,780.	ppb	1.30	#VALUE!	
44 Ca	36,190.	36,190.	ppb	0.84	200000.	
51 V	0.4125	0.4125	ppb	31.59	1000.	
52 Cr	0.3803	0.3803	ppb	6.71	1000.	
53 Cr	5.691	5.691	ppb	10.23	#VALUE!	
55 Mn	180.	180.	ppb	0.73	1000.	
56 Fe	92.28	92.28	ppb	2.35	#VALUE!	
57 Fe	149.4	149.4	ppb	3.60	100000.	
59 Co	0.4333	0.4333	ppb	9.73	1000.	
60 Ni	1.259	1.259	ppb	5.80	1000.	
63 Cu	17.57	17.57	ppb	1.06	#VALUE!	
65 Cu	16.9	16.9	ppb	1.65	1000.	
66 Zn	26.17	26.17	ppb	0.88	1000.	
68 Zn	26.52	26.52	ppb	1.71	#VALUE!	
75 As	1.708	1.708	ppb	3.76	1000.	
82 Se	0.2374	0.2374	ppb	79.57	1000.	
88 Sr	145.2	145.2	ppb	0.83	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.733	1.733	ppb	1.26	1000.	
107 Ag	0.0127	0.0127	ppb	35.02	500.	
109 Ag	0.0151	0.0151	ppb	4.32	#VALUE!	
111 Cd	-0.13	-0.13	ppb	51.44	#VALUE!	
114 Cd	0.0173	0.0173	ppb	10.61	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.2672	0.2672	ppb	5.06	1000.	
120 Sn	0.2507	0.2507	ppb	7.30	#VALUE!	
121 Sb	0.1829	0.1829	ppb	6.91	#VALUE!	
123 Sb	0.1718	0.1718	ppb	18.30	1000.	
135 Ba	18.84	18.84	ppb	3.03	1000.	
137 Ba	18.88	18.88	ppb	0.93	#VALUE!	
182 W	0.1768	0.1768	ppb ---		#VALUE!	
203 Tl	0.0017	0.0017	ppb	220.75	1000.	
205 Tl	0.0036	0.0036	ppb	30.70	#VALUE!	
208 Pb	0.436	0.436	ppb	3.74	1000.	
232 Th	0.1417	0.1417	ppb	13.49	1000.	
238 U	0.1752	0.1752	ppb	4.53	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2599269.00	0.91	3254874.00	79.9	69.5 - 130	
45 Sc	2440710.80	0.42	2845192.80	85.8	69.5 - 130	
72 Ge	547829.69	0.92	628164.81	87.2	69.5 - 130	
159 Tb	4500132.00	1.48	4911963.50	91.6	69.5 - 130	
209 Bi	2462154.30	2.13	2733046.80	90.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000148

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\089SMPL.D\089SMPL.D#
Date Acquired: Jul 23 2014 04:46 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5280-001L
Misc Info: DILUTION 1.6/8
Vial Number: 2506
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0038	0.0008	ppb	178.53	100.	
11 B	67.65	13.53	ppb	1.99	1000.	
23 Na	69,850.	13,970.	ppb	3.56	200000.	
25 Mg	4,406.5	881.3	ppb	3.40	200000.	
27 Al	56.	11.2	ppb	8.32	200000.	
28 Si	2,555.5	511.1	ppb	41.73	#VALUE!	
29 Si	-913.5	-182.7	ppb	111.71	10000.	LOW
39 K	6,635.	1,327.	ppb	4.10	200000.	
43 Ca	37,595.	7,519.	ppb	2.87	#VALUE!	
44 Ca	37,625.	7,525.	ppb	3.61	200000.	
51 V	0.0481	0.0096	ppb	140.93	1000.	
52 Cr	0.2574	0.0515	ppb	59.83	1000.	
53 Cr	7.16	1.432	ppb	13.92	#VALUE!	
55 Mn	179.9	35.98	ppb	3.56	1000.	
56 Fe	108.9	21.78	ppb	22.97	#VALUE!	
57 Fe	118.8	23.76	ppb	17.86	100000.	
59 Co	0.3448	0.069	ppb	2.16	1000.	
60 Ni	1.2745	0.2549	ppb	21.10	1000.	
63 Cu	17.515	3.503	ppb	4.46	#VALUE!	
65 Cu	16.73	3.346	ppb	5.79	1000.	
66 Zn	26.285	5.257	ppb	3.09	1000.	
68 Zn	26.78	5.356	ppb	3.63	#VALUE!	
75 As	1.8965	0.3793	ppb	54.23	1000.	
82 Se	-0.81	-0.162	ppb	218.89	1000.	
88 Sr	142.8	28.56	ppb	4.31	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.6325	0.3265	ppb	10.63	1000.	
107 Ag	-0.0006	-0.0001	ppb	2387.90	500.	
109 Ag	-0.0073	-0.0015	ppb	190.29	#VALUE!	
111 Cd	-0.5605	-0.1121	ppb	13.31	#VALUE!	
114 Cd	0.0368	0.0074	ppb	36.18	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.2774	0.0555	ppb	25.58	1000.	
120 Sn	0.2784	0.0557	ppb	3.46	#VALUE!	
121 Sb	0.1835	0.0367	ppb	14.53	#VALUE!	
123 Sb	0.1962	0.0392	ppb	21.69	1000.	
135 Ba	19.055	3.811	ppb	5.29	1000.	
137 Ba	18.5	3.7	ppb	2.99	#VALUE!	
182 W	0.1994	0.0399	ppb ---		#VALUE!	
203 Tl	-0.0236	-0.0047	ppb	37.95	1000.	
205 Tl	0.018	0.0036	ppb	114.96	#VALUE!	
208 Pb	0.4295	0.0859	ppb	8.70	1000.	
232 Th	0.3686	0.0737	ppb	19.27	1000.	
238 U	0.1612	0.0322	ppb	12.71	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2704577.80	2.97	3254874.00	83.1	69.5 - 130	
45 Sc	2531942.80	3.42	2845192.80	89.0	69.5 - 130	
72 Ge	570913.44	3.60	628164.81	90.9	69.5 - 130	
159 Tb	4633520.00	2.85	4911963.50	94.3	69.5 - 130	
209 Bi	2615810.80	3.90	2733046.80	95.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000149

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\090SMPL.D\090SMPL.D#
Date Acquired: Jul 23 2014 04:49 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5280-001S
Misc Info: DILUTION 1.6/8
Vial Number: 2507
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	47.955	9.591	ppb	1.44	100.	
11 B	521.5	104.3	ppb	0.84	1000.	
23 Na	75,150.	15,030.	ppb	1.78	200000.	
25 Mg	9,655.	1,931.	ppb	1.37	200000.	
27 Al	2,049.	409.8	ppb	1.57	200000.	
28 Si	7,495.	1,499.	ppb	5.87	#VALUE!	
29 Si	3,906.5	781.3	ppb	3.55	10000.	
39 K	16,660.	3,332.	ppb	1.61	200000.	
43 Ca	38,575.	7,715.	ppb	2.74	#VALUE!	
44 Ca	38,205.	7,641.	ppb	1.79	200000.	
51 V	500.5	100.1	ppb	1.51	1000.	
52 Cr	192.85	38.57	ppb	1.39	1000.	
53 Cr	196.45	39.29	ppb	0.86	#VALUE!	
55 Mn	677.5	135.5	ppb	1.24	1000.	
56 Fe	1,121.5	224.3	ppb	1.36	#VALUE!	
57 Fe	1,134.5	226.9	ppb	0.30	100000.	
59 Co	496.45	99.29	ppb	1.31	1000.	
60 Ni	499.9	99.98	ppb	1.47	1000.	
63 Cu	265.3	53.06	ppb	1.57	#VALUE!	
65 Cu	265.3	53.06	ppb	1.45	1000.	
66 Zn	526.	105.2	ppb	2.16	1000.	
68 Zn	558.5	111.7	ppb	1.53	#VALUE!	
75 As	107.45	21.49	ppb	1.36	1000.	
82 Se	105.5	21.1	ppb	0.97	1000.	
88 Sr	659.5	131.9	ppb	1.10	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	307.9	61.58	ppb	0.77	1000.	
107 Ag	51.	10.2	ppb	1.47	500.	
109 Ag	50.75	10.15	ppb	0.82	#VALUE!	
111 Cd	256.05	51.21	ppb	1.75	#VALUE!	
114 Cd	255.9	51.18	ppb	1.35	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	494.9	98.98	ppb	2.66	1000.	
120 Sn	496.1	99.22	ppb	2.15	#VALUE!	
121 Sb	105.05	21.01	ppb	2.26	#VALUE!	
123 Sb	104.85	20.97	ppb	2.68	1000.	
135 Ba	1,972.5	394.5	ppb	2.51	1000.	
137 Ba	1,975.5	395.1	ppb	2.52	#VALUE!	
182 W	99.55	19.91	ppb ---		#VALUE!	
203 Tl	104.3	20.86	ppb	2.44	1000.	
205 Tl	104.7	20.94	ppb	1.73	#VALUE!	
208 Pb	106.85	21.37	ppb	2.24	1000.	
232 Th	1.318	0.2636	ppb	22.74	1000.	
238 U	103.2	20.64	ppb	2.01	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2787794.30	0.69	3254874.00	85.6	69.5 - 130	
45 Sc	2510484.80	1.35	2845192.80	88.2	69.5 - 130	
72 Ge	557989.13	0.75	628164.81	88.8	69.5 - 130	
159 Tb	4592358.00	1.61	4911963.50	93.5	69.5 - 130	
209 Bi	2562799.00	1.08	2733046.80	93.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000150

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\091SMPL.D\091SMPL.D#
Date Acquired: Jul 23 2014 04:52 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5280-001P
Misc Info: DILUTION 1.6/8
Vial Number: 2508
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	51.6	10.32	ppb	0.84	100.	
11 B	514.5	102.9	ppb	0.56	1000.	
23 Na	72,900.	14,580.	ppb	0.45	200000.	
25 Mg	9,270.	1,854.	ppb	0.53	200000.	
27 Al	2,149.	429.8	ppb	0.40	200000.	
28 Si	6,925.	1,385.	ppb	7.04	#VALUE!	
29 Si	2,679.5	535.9	ppb	35.68	10000.	
39 K	16,040.	3,208.	ppb	0.42	200000.	
43 Ca	37,270.	7,454.	ppb	0.35	#VALUE!	
44 Ca	37,255.	7,451.	ppb	0.40	200000.	
51 V	526.5	105.3	ppb	0.43	1000.	
52 Cr	202.35	40.47	ppb	0.61	1000.	
53 Cr	206.45	41.29	ppb	1.19	#VALUE!	
55 Mn	695.	139.	ppb	0.41	1000.	
56 Fe	1,179.	235.8	ppb	0.94	#VALUE!	
57 Fe	1,151.5	230.3	ppb	0.55	100000.	
59 Co	521.	104.2	ppb	0.89	1000.	
60 Ni	525.	105.	ppb	0.42	1000.	
63 Cu	276.7	55.34	ppb	0.64	#VALUE!	
65 Cu	276.2	55.24	ppb	0.48	1000.	
66 Zn	549.	109.8	ppb	0.62	1000.	
68 Zn	583.5	116.7	ppb	0.18	#VALUE!	
75 As	103.5	20.7	ppb	0.83	1000.	
82 Se	100.35	20.07	ppb	2.39	1000.	
88 Sr	634.	126.8	ppb	1.25	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	296.4	59.28	ppb	0.64	1000.	
107 Ag	53.95	10.79	ppb	0.25	500.	
109 Ag	54.4	10.88	ppb	0.75	#VALUE!	
111 Cd	244.3	48.86	ppb	0.48	#VALUE!	
114 Cd	244.8	48.96	ppb	0.16	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	472.65	94.53	ppb	0.80	1000.	
120 Sn	474.3	94.86	ppb	0.34	#VALUE!	
121 Sb	100.15	20.03	ppb	0.69	#VALUE!	
123 Sb	100.15	20.03	ppb	0.49	1000.	
135 Ba	2,074.	414.8	ppb	0.24	1000.	
137 Ba	2,073.	414.6	ppb	0.49	#VALUE!	
182 W	95.25	19.05	ppb ---		#VALUE!	
203 Tl	98.3	19.66	ppb	0.94	1000.	
205 Tl	98.9	19.78	ppb	0.77	#VALUE!	
208 Pb	101.55	20.31	ppb	0.87	1000.	
232 Th	0.848	0.1696	ppb	3.16	1000.	
238 U	98.2	19.64	ppb	1.25	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2740280.50	0.08	3254874.00	84.2	69.5 - 130	
45 Sc	2501426.30	1.07	2845192.80	87.9	69.5 - 130	
72 Ge	553990.69	1.66	628164.81	88.2	69.5 - 130	
159 Tb	4566772.50	1.14	4911963.50	93.0	69.5 - 130	
209 Bi	2569331.50	1.34	2733046.80	94.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000151

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\092SMPL.D\092SMPL.D#
Date Acquired: Jul 23 2014 04:56 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5282-001
Misc Info: DILUTION 1.6/8
Vial Number: 2509
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.076	0.0152	ppb	20.98	100.	
11 B	299.45	59.89	ppb	1.99	1000.	
23 Na	94,850.	18,970.	ppb	0.75	200000.	
25 Mg	85,000.	17,000.	ppb	0.82	200000.	
27 Al	8,905.	1,781.	ppb	0.80	200000.	
28 Si	2,104.5	420.9	ppb	35.69	#VALUE!	
29 Si	-1,319.5	-263.9	ppb	63.89	10000.	LOW
39 K	2,057.	411.4	ppb	1.89	200000.	
43 Ca	11,975.	2,395.	ppb	1.70	#VALUE!	
44 Ca	11,830.	2,366.	ppb	1.80	200000.	
51 V	52.15	10.43	ppb	45.34	1000.	
52 Cr	6,160.	1,232.	ppb	0.25	1000.	>LDR
53 Cr	6,365.	1,273.	ppb	1.29	#VALUE!	
55 Mn	178.75	35.75	ppb	1.02	1000.	
56 Fe	1,604.5	320.9	ppb	1.53	#VALUE!	
57 Fe	1,545.5	309.1	ppb	1.02	100000.	
59 Co	15.29	3.058	ppb	1.25	1000.	
60 Ni	7.225	1.445	ppb	2.26	1000.	
63 Cu	47.665	9.533	ppb	0.44	#VALUE!	
65 Cu	46.56	9.312	ppb	1.01	1000.	
66 Zn	38.97	7.794	ppb	1.01	1000.	
68 Zn	43.81	8.762	ppb	1.83	#VALUE!	
75 As	4.6795	0.9359	ppb	15.72	1000.	
82 Se	0.3418	0.0684	ppb	88.02	1000.	
88 Sr	61.25	12.25	ppb	1.25	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.045	0.209	ppb	4.38	1000.	
107 Ag	0.1078	0.0216	ppb	35.32	500.	
109 Ag	0.0016	0.0003	ppb	560.27	#VALUE!	
111 Cd	0.4576	0.0915	ppb	53.04	#VALUE!	
114 Cd	0.1357	0.0271	ppb	13.39	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	1.755	0.351	ppb	12.64	1000.	
120 Sn	1.7505	0.3501	ppb	12.26	#VALUE!	
121 Sb	0.154	0.0308	ppb	21.62	#VALUE!	
123 Sb	0.1951	0.039	ppb	28.91	1000.	
135 Ba	16.96	3.392	ppb	5.71	1000.	
137 Ba	16.345	3.269	ppb	2.16	#VALUE!	
182 W	0.481	0.0962	ppb ---		#VALUE!	
203 Tl	0.0733	0.0147	ppb	53.38	1000.	
205 Tl	0.0824	0.0165	ppb	20.28	#VALUE!	
208 Pb	1.737	0.3474	ppb	1.83	1000.	
232 Th	0.3863	0.0773	ppb	2.42	1000.	
238 U	0.3182	0.0636	ppb	9.69	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2654271.30	1.74	3254874.00	81.5	69.5 - 130	
45 Sc	2451869.30	0.90	2845192.80	86.2	69.5 - 130	
72 Ge	541825.56	1.14	628164.81	86.3	69.5 - 130	
159 Tb	4493857.50	1.05	4911963.50	91.5	69.5 - 130	
209 Bi	2472145.80	1.14	2733046.80	90.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000152

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\093SMPL.D\093SMPL.D#
Date Acquired: Jul 23 2014 04:59 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5282-001
Misc Info: DILUTION 0.4/10
Vial Number: 2510
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0718	0.0029	ppb	54.16	100.	
11 B	324.	12.96	ppb	2.06	1000.	
23 Na	97,600.	3,904.	ppb	1.05	200000.	
25 Mg	90,375.	3,615.	ppb	1.92	200000.	
27 Al	9,515.	380.6	ppb	1.69	200000.	
28 Si	7,065.	282.6	ppb	18.86	#VALUE!	
29 Si	-8,540.	-341.6	ppb	10.32	10000.	LOW
39 K	2,032.25	81.29	ppb	7.01	200000.	
43 Ca	11,910.	476.4	ppb	3.26	#VALUE!	
44 Ca	12,075.	483.	ppb	3.11	200000.	
51 V	162.25	6.49	ppb	6.00	1000.	
52 Cr	6,440.	257.6	ppb	1.36	1000.	
53 Cr	6,335.	253.4	ppb	1.06	#VALUE!	
55 Mn	182.675	7.307	ppb	1.10	1000.	
56 Fe	1,951.75	78.07	ppb	2.45	#VALUE!	
57 Fe	1,571.5	62.86	ppb	4.16	100000.	
59 Co	15.145	0.6058	ppb	4.19	1000.	
60 Ni	6.9675	0.2787	ppb	7.10	1000.	
63 Cu	45.85	1.834	ppb	0.66	#VALUE!	
65 Cu	45.35	1.814	ppb	1.57	1000.	
66 Zn	39.275	1.571	ppb	2.39	1000.	
68 Zn	53.775	2.151	ppb	7.00	#VALUE!	
75 As	5.6275	0.2251	ppb	16.27	1000.	
82 Se	0.62	0.0248	ppb	472.18	1000.	
88 Sr	63.575	2.543	ppb	1.68	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.1688	0.0468	ppb	25.20	1000.	
107 Ag	0.1201	0.0048	ppb	70.55	500.	
109 Ag	-0.1095	-0.0044	ppb	56.24	#VALUE!	
111 Cd	-1.7945	-0.0718	ppb	68.78	#VALUE!	
114 Cd	0.0777	0.0031	ppb	16.63	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	2.266	0.0906	ppb	20.65	1000.	
120 Sn	2.346	0.0938	ppb	15.46	#VALUE!	
121 Sb	0.1125	0.0045	ppb	40.31	#VALUE!	
123 Sb	0.1282	0.0051	ppb	140.60	1000.	
135 Ba	16.8925	0.6757	ppb	5.09	1000.	
137 Ba	17.4525	0.6981	ppb	5.57	#VALUE!	
182 W	0.6488	0.026	ppb ---		#VALUE!	
203 Tl	0.0067	0.0003	ppb	681.66	1000.	
205 Tl	0.0716	0.0029	ppb	25.72	#VALUE!	
208 Pb	1.691	0.0676	ppb	11.04	1000.	
232 Th	1.501	0.06	ppb	12.88	1000.	
238 U	0.3163	0.0127	ppb	12.29	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2724546.80	0.86	3254874.00	83.7	69.5 - 130	
45 Sc	2463706.50	1.21	2845192.80	86.6	69.5 - 130	
72 Ge	547388.63	0.62	628164.81	87.1	69.5 - 130	
159 Tb	4520332.50	0.84	4911963.50	92.0	69.5 - 130	
209 Bi	2536557.30	0.77	2733046.80	92.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000153

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\094SMPL.D\094SMPL.D#
Date Acquired: Jul 23 2014 05:03 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5283-001
Misc Info:
Vial Number: 2511
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0231	0.0231	ppb	15.07	100.	
11 B	157.9	157.9	ppb	2.46	1000.	
23 Na	50,460.	50,460.	ppb	1.31	200000.	
25 Mg	5,353.	5,353.	ppb	0.89	200000.	
27 Al	110.4	110.4	ppb	1.20	200000.	
28 Si	6,013.	6,013.	ppb	2.29	#VALUE!	
29 Si	4,211.	4,211.	ppb	3.70	10000.	
39 K	8,982.	8,982.	ppb	1.11	200000.	
43 Ca	20,870.	20,870.	ppb	1.21	#VALUE!	
44 Ca	20,230.	20,230.	ppb	1.39	200000.	
51 V	0.5848	0.5848	ppb	8.91	1000.	
52 Cr	0.615	0.615	ppb	4.54	1000.	
53 Cr	7.402	7.402	ppb	4.91	#VALUE!	
55 Mn	905.5	905.5	ppb	1.48	1000.	
56 Fe	1,463.	1,463.	ppb	1.47	#VALUE!	
57 Fe	1,487.	1,487.	ppb	1.21	100000.	
59 Co	1.745	1.745	ppb	1.87	1000.	
60 Ni	4.082	4.082	ppb	1.58	1000.	
63 Cu	43.05	43.05	ppb	2.14	#VALUE!	
65 Cu	42.62	42.62	ppb	0.89	1000.	
66 Zn	26.6	26.6	ppb	0.41	1000.	
68 Zn	26.95	26.95	ppb	3.11	#VALUE!	
75 As	5.885	5.885	ppb	4.11	1000.	
82 Se	0.08	0.08	ppb	161.35	1000.	
88 Sr	88.36	88.36	ppb	1.53	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.9409	0.9409	ppb	2.72	1000.	
107 Ag	0.0144	0.0144	ppb	16.87	500.	
109 Ag	0.0073	0.0073	ppb	61.71	#VALUE!	
111 Cd	-0.0532	-0.0532	ppb	80.11	#VALUE!	
114 Cd	0.0719	0.0719	ppb	12.59	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.4503	0.4503	ppb	2.82	1000.	
120 Sn	0.4199	0.4199	ppb	3.69	#VALUE!	
121 Sb	0.2461	0.2461	ppb	5.69	#VALUE!	
123 Sb	0.2427	0.2427	ppb	5.38	1000.	
135 Ba	6.841	6.841	ppb	2.33	1000.	
137 Ba	6.864	6.864	ppb	4.64	#VALUE!	
182 W	0.1161	0.1161	ppb ---		#VALUE!	
203 Tl	0.006	0.006	ppb	63.95	1000.	
205 Tl	0.0127	0.0127	ppb	26.09	#VALUE!	
208 Pb	0.4721	0.4721	ppb	1.39	1000.	
232 Th	0.0806	0.0806	ppb	13.36	1000.	
238 U	0.0875	0.0875	ppb	3.94	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2634526.50	1.81	3254874.00	80.9	69.5 - 130	
45 Sc	2431635.80	1.82	2845192.80	85.5	69.5 - 130	
72 Ge	539201.31	2.33	628164.81	85.8	69.5 - 130	
159 Tb	4437829.00	2.18	4911963.50	90.3	69.5 - 130	
209 Bi	2448258.80	1.27	2733046.80	89.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000154

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\095SMPL.D\095SMPL.D#
Date Acquired: Jul 23 2014 05:06 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBWHG09IMW2
Misc Info: DILUTION 1.6/8
Vial Number: 2512
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0008	0.0002	ppb	450.84	100.	
11 B	13.97	2.794	ppb	13.35	1000.	
23 Na	67.05	13.41	ppb	7.67	200000.	
25 Mg	9.47	1.894	ppb	13.60	200000.	
27 Al	14.24	2.848	ppb	2.85	200000.	
28 Si	412.2	82.44	ppb	96.14	#VALUE!	
29 Si	-3,022.5	-604.5	ppb	20.43	10000.	LOW
39 K	-31.815	-6.363	ppb	13.02	200000.	
43 Ca	63.2	12.64	ppb	47.10	#VALUE!	
44 Ca	13.635	2.727	ppb	114.56	200000.	
51 V	1.3745	0.2749	ppb	72.46	1000.	
52 Cr	1.459	0.2918	ppb	4.50	1000.	
53 Cr	73.7	14.74	ppb	3.68	#VALUE!	
55 Mn	1.166	0.2332	ppb	12.74	1000.	
56 Fe	66.05	13.21	ppb	4.68	#VALUE!	
57 Fe	16.945	3.389	ppb	38.18	100000.	
59 Co	-0.0497	-0.0099	ppb	32.74	1000.	
60 Ni	0.0861	0.0172	ppb	86.88	1000.	
63 Cu	-0.1517	-0.0303	ppb	18.01	#VALUE!	
65 Cu	0.0079	0.0016	ppb	938.49	1000.	
66 Zn	1.414	0.2828	ppb	22.18	1000.	
68 Zn	2.419	0.4838	ppb	41.24	#VALUE!	
75 As	0.8725	0.1745	ppb	108.88	1000.	
82 Se	-0.2728	-0.0546	ppb	238.50	1000.	
88 Sr	0.085	0.017	ppb	24.65	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	0.0637	0.0127	ppb	56.48	1000.	
107 Ag	-0.0211	-0.0042	ppb	39.54	500.	
109 Ag	-0.0078	-0.0016	ppb	22.97	#VALUE!	
111 Cd	-0.3907	-0.0781	ppb	15.75	#VALUE!	
114 Cd	0.0307	0.0061	ppb	83.02	1000.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	0.5045	0.1009	ppb	5.96	1000.	
120 Sn	0.4826	0.0965	ppb	19.66	#VALUE!	
121 Sb	0.0207	0.0041	ppb	108.63	#VALUE!	
123 Sb	0.0549	0.011	ppb	36.51	1000.	
135 Ba	0.1367	0.0273	ppb	38.60	1000.	
137 Ba	0.2128	0.0426	ppb	14.05	#VALUE!	
182 W	0.0938	0.0188	ppb	---	#VALUE!	
203 Tl	-0.0136	-0.0027	ppb	35.00	1000.	
205 Tl	-0.0016	-0.0003	ppb	249.10	#VALUE!	
208 Pb	0.0132	0.0026	ppb	389.21	1000.	
232 Th	0.4291	0.0858	ppb	13.95	1000.	
238 U	0.0035	0.0007	ppb	90.38	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2795267.80	0.47	3254874.00	85.9	69.5 - 130	
45 Sc	2492672.50	0.09	2845192.80	87.6	69.5 - 130	
72 Ge	547060.38	0.15	628164.81	87.1	69.5 - 130	
159 Tb	4543917.50	0.30	4911963.50	92.5	69.5 - 130	
209 Bi	2573588.00	0.29	2733046.80	94.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000155

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\096_CCV.D\096_CCV.D#
Date Acquired: Jul 23 2014 05:10 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.71	ppb	1.29	25	94.84	
11 B	24.03	ppb	2.22	25	96.12	
23 Na	4,771.	ppb	1.70	5,000	95.42	
25 Mg	4,826.	ppb	1.51	5,000	96.52	
27 Al	488.8	ppb	1.71	500	97.76	
28 Si	418.2	ppb	23.20	500	83.64	
29 Si	-359.2	ppb	56.88	500	-71.84	Fail
39 K	4,827.	ppb	1.83	5,000	96.54	
43 Ca	4,846.	ppb	0.14	5,000	96.92	
44 Ca	4,959.	ppb	0.94	5,000	99.18	
51 V	24.23	ppb	1.35	25	96.92	
52 Cr	24.41	ppb	1.38	25	97.64	
53 Cr	24.87	ppb	1.43	25	99.48	
55 Mn	24.24	ppb	1.17	25	96.96	
56 Fe	4,868.	ppb	1.46	5,000	97.36	
57 Fe	4,974.	ppb	1.25	5,000	99.48	
59 Co	24.29	ppb	0.97	25	97.16	
60 Ni	23.85	ppb	0.10	25	95.4	
63 Cu	24.05	ppb	1.04	25	96.2	
65 Cu	24.22	ppb	1.95	25	96.88	
66 Zn	23.85	ppb	1.82	25	95.4	
68 Zn	24.04	ppb	0.74	25	96.16	
75 As	24.03	ppb	1.40	25	96.12	
82 Se	24.03	ppb	0.33	25	96.12	
88 Sr	25.03	ppb	1.33	25	100.12	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.61	ppb	2.04	25	98.44	
107 Ag	25.15	ppb	0.91	25	100.6	
109 Ag	24.97	ppb	1.18	25	99.88	
111 Cd	24.92	ppb	0.42	25	99.68	
114 Cd	25.05	ppb	0.50	25	100.2	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.86	ppb	1.66	25	95.44	
120 Sn	24.33	ppb	1.32	25	97.32	
121 Sb	23.97	ppb	1.31	25	95.88	
123 Sb	23.92	ppb	1.70	25	95.68	
135 Ba	24.01	ppb	3.37	25	96.04	
137 Ba	24.15	ppb	2.26	25	96.6	
182 W	24.33	ppb	1.43	25	97.32	
203 Tl	23.86	ppb	2.40	25	95.44	
205 Tl	24.16	ppb	1.46	25	96.64	
208 Pb	24.03	ppb	1.42	25	96.12	
232 Th	22.73	ppb	3.22	25	90.92	
238 U	23.67	ppb	1.36	25	94.68	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2802572.30	1.22	3254874.00	86.1	80 - 120.4	
45 Sc	2547741.80	1.57	2845192.80	89.5	80 - 120.4	
72 Ge	559151.31	1.40	628164.81	89.0	80 - 120.4	
159 Tb	4602610.50	2.02	4911963.50	93.7	80 - 120.4	
209 Bi	2597936.80	1.69	2733046.80	95.1	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000156

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\097_CCB.D\097_CCB.D#
Date Acquired: Jul 23 2014 05:13 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0039	ppb	37.91	1.00	
11 B	0.7906	ppb	17.48	1.00	
23 Na	3.849	ppb	5.63	1.00	
25 Mg	0.9128	ppb	21.23	1.00	
27 Al	1.719	ppb	1.40	1.00	
28 Si	124.2	ppb	62.50	1.00	
29 Si	-427.9	ppb	19.30	1.00	Fail-DoD
39 K	-5.214	ppb	32.55	1.00	
43 Ca	3.221	ppb	148.93	1.00	
44 Ca	-9.237	ppb	43.78	1.00	
51 V	0.0659	ppb	10.86	1.00	
52 Cr	0.0517	ppb	6.54	1.00	
53 Cr	0.4882	ppb	42.69	1.00	
55 Mn	0.0731	ppb	26.89	1.00	
56 Fe	6.896	ppb	20.32	1.00	
57 Fe	0.098	ppb	3405.80	1.00	
59 Co	-0.0098	ppb	43.40	1.00	
60 Ni	0.0123	ppb	107.97	1.00	
63 Cu	-0.0789	ppb	6.06	1.00	
65 Cu	-0.0589	ppb	34.43	1.00	
66 Zn	0.4289	ppb	6.93	1.00	
68 Zn	0.5737	ppb	42.46	1.00	
75 As	0.0843	ppb	132.06	1.00	
82 Se	-0.0995	ppb	54.74	1.00	
88 Sr	0.0109	ppb	33.40	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0522	ppb	8.33	1.00	
107 Ag	-0.0037	ppb	66.10	1.00	
109 Ag	-0.0016	ppb	60.56	1.00	
111 Cd	-0.0828	ppb	27.31	1.00	
114 Cd	0.0045	ppb	82.94	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0668	ppb	26.05	1.00	
120 Sn	0.0726	ppb	10.23	1.00	
121 Sb	0.013	ppb	49.79	1.00	
123 Sb	0.0185	ppb	52.53	1.00	
135 Ba	0.0076	ppb	75.45	1.00	
137 Ba	0.0083	ppb	47.09	1.00	
182 W	0.0968	ppb	5.23	1.00	
203 Tl	0.004	ppb	159.95	1.00	
205 Tl	0.0092	ppb	13.46	1.00	
208 Pb	0.0052	ppb	195.45	1.00	
232 Th	0.1622	ppb	13.56	1.00	
238 U	0.002	ppb	56.51	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2831040.80	0.59	3254874.00	87.0	79.5 - 120	
45 Sc	2547616.50	0.67	2845192.80	89.5	79.5 - 120	
72 Ge	562284.38	0.88	628164.81	89.5	79.5 - 120	
159 Tb	4615911.50	0.55	4911963.50	94.0	79.5 - 120	
209 Bi	2616969.30	1.02	2733046.80	95.8	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000157

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\098SMPL.D\098SMPL.D#
Date Acquired: Jul 23 2014 05:17 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSWHG09IMW2
Misc Info: DILUTION 1.6/8
Vial Number: 3101
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	46.915	9.383	ppb	2.03	100.	
11 B	445.35	89.07	ppb	1.92	1000.	
23 Na	7,515.	1,503.	ppb	1.47	200000.	
25 Mg	5,075.	1,015.	ppb	1.69	200000.	
27 Al	2,024.	404.8	ppb	1.42	200000.	
28 Si	4,455.5	891.1	ppb	12.93	#VALUE!	
29 Si	3.033	0.6066	ppb	29327.00	10000.	
39 K	10,010.	2,002.	ppb	1.62	200000.	
43 Ca	2,855.	571.	ppb	2.54	#VALUE!	
44 Ca	2,146.	429.2	ppb	4.27	200000.	
51 V	509.5	101.9	ppb	0.77	1000.	
52 Cr	197.8	39.56	ppb	1.19	1000.	
53 Cr	254.35	50.87	ppb	1.73	#VALUE!	
55 Mn	506.5	101.3	ppb	1.83	1000.	
56 Fe	1,088.	217.6	ppb	2.81	#VALUE!	
57 Fe	1,012.	202.4	ppb	5.17	100000.	
59 Co	501.	100.2	ppb	1.37	1000.	
60 Ni	502.	100.4	ppb	1.32	1000.	
63 Cu	250.3	50.06	ppb	1.38	#VALUE!	
65 Cu	251.9	50.38	ppb	1.93	1000.	
66 Zn	489.65	97.93	ppb	1.69	1000.	
68 Zn	529.	105.8	ppb	1.98	#VALUE!	
75 As	102.3	20.46	ppb	1.99	1000.	
82 Se	100.65	20.13	ppb	1.62	1000.	
88 Sr	513.	102.6	ppb	0.99	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	303.35	60.67	ppb	1.76	1000.	
107 Ag	52.15	10.43	ppb	0.64	500.	
109 Ag	51.55	10.31	ppb	0.56	#VALUE!	
111 Cd	261.6	52.32	ppb	1.83	#VALUE!	
114 Cd	262.55	52.51	ppb	1.45	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	484.5	96.9	ppb	1.88	1000.	
120 Sn	485.85	97.17	ppb	2.16	#VALUE!	
121 Sb	99.7	19.94	ppb	2.08	#VALUE!	
123 Sb	98.7	19.74	ppb	2.23	1000.	
135 Ba	1,960.	392.	ppb	2.09	1000.	
137 Ba	1,961.	392.2	ppb	1.56	#VALUE!	
182 W	105.7	21.14	ppb ---		#VALUE!	
203 Tl	100.8	20.16	ppb	1.33	1000.	
205 Tl	101.65	20.33	ppb	2.05	#VALUE!	
208 Pb	102.3	20.46	ppb	2.13	1000.	
232 Th	3.1085	0.6217	ppb	18.35	1000.	
238 U	98.5	19.7	ppb	2.36	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2902791.50	1.36	3254874.00	89.2	69.5 - 130	
45 Sc	2529837.30	1.25	2845192.80	88.9	69.5 - 130	
72 Ge	553525.50	1.22	628164.81	88.1	69.5 - 130	
159 Tb	4598901.50	1.30	4911963.50	93.6	69.5 - 130	
209 Bi	2577205.30	1.50	2733046.80	94.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000158

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\099SMPL.D\099SMPL.D#
Date Acquired: Jul 23 2014 05:20 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-009
Misc Info: DILUTION 1.6/8
Vial Number: 3102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0152	0.003	ppb	52.46	100.	
11 B	8.2	1.64	ppb	13.92	1000.	
23 Na	46.495	9.299	ppb	0.76	200000.	
25 Mg	8.395	1.679	ppb	6.58	200000.	
27 Al	17.405	3.481	ppb	57.00	200000.	
28 Si	-53.3	-10.66	ppb	88.88	#VALUE!	
29 Si	-3,051.5	-610.3	ppb	15.13	10000.	LOW
39 K	-16.075	-3.215	ppb	141.96	200000.	
43 Ca	48.345	9.669	ppb	33.85	#VALUE!	
44 Ca	-24.44	-4.888	ppb	24.76	200000.	
51 V	1.738	0.3476	ppb	21.41	1000.	
52 Cr	1.3565	0.2713	ppb	7.08	1000.	
53 Cr	65.5	13.1	ppb	3.78	#VALUE!	
55 Mn	0.8535	0.1707	ppb	9.03	1000.	
56 Fe	53.	10.6	ppb	19.02	#VALUE!	
57 Fe	8.055	1.611	ppb	174.74	100000.	
59 Co	-0.0102	-0.002	ppb	98.87	1000.	
60 Ni	0.0999	0.02	ppb	91.39	1000.	
63 Cu	-0.0824	-0.0165	ppb	24.74	#VALUE!	
65 Cu	0.0443	0.0089	ppb	207.59	1000.	
66 Zn	1.217	0.2434	ppb	21.93	1000.	
68 Zn	2.637	0.5274	ppb	2.84	#VALUE!	
75 As	0.1895	0.0379	ppb	213.93	1000.	
82 Se	-1.1265	-0.2253	ppb	20.08	1000.	
88 Sr	0.0869	0.0174	ppb	14.47	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.317	0.0634	ppb	15.46	1000.	
107 Ag	-0.0144	-0.0029	ppb	22.55	500.	
109 Ag	0.0032	0.0006	ppb	151.47	#VALUE!	
111 Cd	-0.4494	-0.0899	ppb	11.68	#VALUE!	
114 Cd	0.0285	0.0057	ppb	66.06	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.843	0.1686	ppb	22.17	1000.	
120 Sn	0.7875	0.1575	ppb	13.78	#VALUE!	
121 Sb	0.0527	0.0105	ppb	72.08	#VALUE!	
123 Sb	0.1221	0.0244	ppb	13.42	1000.	
135 Ba	0.3311	0.0662	ppb	32.20	1000.	
137 Ba	0.2191	0.0438	ppb	56.00	#VALUE!	
182 W	0.2979	0.0596	ppb ---		#VALUE!	
203 Tl	0.0326	0.0065	ppb	132.14	1000.	
205 Tl	0.037	0.0074	ppb	58.48	#VALUE!	
208 Pb	0.0737	0.0147	ppb	4.71	1000.	
232 Th	0.584	0.1168	ppb	6.33	1000.	
238 U	0.0188	0.0038	ppb	29.11	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2875870.50	1.89	3254874.00	88.4	69.5 - 130	
45 Sc	2547884.80	0.94	2845192.80	89.6	69.5 - 130	
72 Ge	558466.06	1.17	628164.81	88.9	69.5 - 130	
159 Tb	4640507.00	1.26	4911963.50	94.5	69.5 - 130	
209 Bi	2607064.30	1.16	2733046.80	95.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000159

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\100SMPL.D\100SMPL.D#
Date Acquired: Jul 23 2014 05:24 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-009L
Misc Info: DILUTION 0.4/10
Vial Number: 3103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0386	0.0015	ppb	105.44	100.	
11 B	14.0075	0.5603	ppb	7.72	1000.	
23 Na	42.625	1.705	ppb	8.24	200000.	
25 Mg	13.9225	0.5569	ppb	11.81	200000.	
27 Al	21.8225	0.8729	ppb	10.69	200000.	
28 Si	734.25	29.37	ppb	187.16	#VALUE!	
29 Si	-14,657.5	-586.3	ppb	14.41	10000.	LOW
39 K	-102.825	-4.113	ppb	175.03	200000.	
43 Ca	76.45	3.058	ppb	114.22	#VALUE!	
44 Ca	-144.475	-5.779	ppb	63.45	200000.	
51 V	2.2798	0.0912	ppb	103.61	1000.	
52 Cr	2.0178	0.0807	ppb	17.14	1000.	
53 Cr	100.75	4.03	ppb	8.64	#VALUE!	
55 Mn	1.5798	0.0632	ppb	20.73	1000.	
56 Fe	163.75	6.55	ppb	13.78	#VALUE!	
57 Fe	-63.45	-2.538	ppb	149.21	100000.	
59 Co	-0.3823	-0.0153	ppb	47.89	1000.	
60 Ni	0.0419	0.0017	ppb	687.76	1000.	
63 Cu	-2.1568	-0.0863	ppb	6.90	#VALUE!	
65 Cu	-1.477	-0.0591	ppb	16.98	1000.	
66 Zn	1.13	0.0452	ppb	60.16	1000.	
68 Zn	9.41	0.3764	ppb	15.17	#VALUE!	
75 As	-0.9478	-0.0379	ppb	276.18	1000.	
82 Se	-1.803	-0.0721	ppb	267.19	1000.	
88 Sr	0.1424	0.0057	ppb	47.55	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.1736	0.0069	ppb	89.82	1000.	
107 Ag	-0.1105	-0.0044	ppb	52.34	500.	
109 Ag	-0.1128	-0.0045	ppb	39.42	#VALUE!	
111 Cd	-2.6175	-0.1047	ppb	35.54	#VALUE!	
114 Cd	0.0812	0.0032	ppb	142.91	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.7815	0.0313	ppb	7.43	1000.	
120 Sn	0.792	0.0317	ppb	29.75	#VALUE!	
121 Sb	0.0292	0.0012	ppb	133.45	#VALUE!	
123 Sb	0.0457	0.0018	ppb	248.96	1000.	
135 Ba	0.6028	0.0241	ppb	40.60	1000.	
137 Ba	-0.044	-0.0018	ppb	448.89	#VALUE!	
182 W	0.6163	0.0247	ppb ---		#VALUE!	
203 Tl	-0.1475	-0.0059	ppb	22.78	1000.	
205 Tl	0.0243	0.001	ppb	88.08	#VALUE!	
208 Pb	0.0502	0.002	ppb	302.04	1000.	
232 Th	1.3453	0.0538	ppb	4.94	1000.	
238 U	0.0051	0.0002	ppb	250.64	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2839859.30	0.72	3254874.00	87.2	69.5 - 130	
45 Sc	2536635.80	0.38	2845192.80	89.2	69.5 - 130	
72 Ge	559981.00	0.48	628164.81	89.1	69.5 - 130	
159 Tb	4607188.50	0.12	4911963.50	93.8	69.5 - 130	
209 Bi	2607184.50	0.93	2733046.80	95.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000160

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\101SMPL.D\101SMPL.D#
Date Acquired: Jul 23 2014 05:27 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-009A
Misc Info: DILUTION 1.6/8
Vial Number: 3104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	9.48	1.896	ppb	0.75	100.	
11 B	189.5	37.9	ppb	1.23	1000.	
23 Na	9,765.	1,953.	ppb	1.84	200000.	
25 Mg	990.5	198.1	ppb	2.36	200000.	
27 Al	2,937.5	587.5	ppb	1.49	200000.	
28 Si	4,381.	876.2	ppb	11.74	#VALUE!	
29 Si	267.45	53.49	ppb	357.82	10000.	
39 K	9,765.	1,953.	ppb	2.28	200000.	
43 Ca	1,009.5	201.9	ppb	4.47	#VALUE!	
44 Ca	916.5	183.3	ppb	3.02	200000.	
51 V	48.99	9.798	ppb	1.58	1000.	
52 Cr	51.	10.2	ppb	1.41	1000.	
53 Cr	123.65	24.73	ppb	0.79	#VALUE!	
55 Mn	21.67	4.334	ppb	2.62	1000.	
56 Fe	1,035.5	207.1	ppb	1.85	#VALUE!	
57 Fe	938.	187.6	ppb	4.82	100000.	
59 Co	9.89	1.978	ppb	1.82	1000.	
60 Ni	19.715	3.943	ppb	1.68	1000.	
63 Cu	30.14	6.028	ppb	0.86	#VALUE!	
65 Cu	30.525	6.105	ppb	2.12	1000.	
66 Zn	96.7	19.34	ppb	2.76	1000.	
68 Zn	96.9	19.38	ppb	1.14	#VALUE!	
75 As	49.29	9.858	ppb	3.19	1000.	
82 Se	47.925	9.585	ppb	3.07	1000.	
88 Sr	48.925	9.785	ppb	1.90	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	49.33	9.866	ppb	1.26	1000.	
107 Ag	10.235	2.047	ppb	0.44	500.	
109 Ag	10.155	2.031	ppb	3.18	#VALUE!	
111 Cd	9.83	1.966	ppb	1.43	#VALUE!	
114 Cd	10.24	2.048	ppb	1.46	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	47.33	9.466	ppb	2.97	1000.	
120 Sn	47.39	9.478	ppb	2.64	#VALUE!	
121 Sb	9.695	1.939	ppb	1.98	#VALUE!	
123 Sb	9.47	1.894	ppb	3.24	1000.	
135 Ba	21.475	4.295	ppb	3.10	1000.	
137 Ba	21.835	4.367	ppb	2.22	#VALUE!	
182 W	49.655	9.931	ppb ---		#VALUE!	
203 Tl	9.98	1.996	ppb	2.13	1000.	
205 Tl	9.595	1.919	ppb	0.96	#VALUE!	
208 Pb	9.955	1.991	ppb	1.62	1000.	
232 Th	8.425	1.685	ppb	1.36	1000.	
238 U	9.56	1.912	ppb	2.96	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2904762.80	0.65	3254874.00	89.2	69.5 - 130	
45 Sc	2543284.00	1.33	2845192.80	89.4	69.5 - 130	
72 Ge	558718.94	0.45	628164.81	88.9	69.5 - 130	
159 Tb	4598918.50	1.38	4911963.50	93.6	69.5 - 130	
209 Bi	2603177.00	1.14	2733046.80	95.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000161

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\102SMPL.D\102SMPL.D#
Date Acquired: Jul 23 2014 05:31 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-009S
Misc Info: DILUTION 1.6/8
Vial Number: 3105
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	46.205	9.241	ppb	1.92	100.	
11 B	446.4	89.28	ppb	1.93	1000.	
23 Na	7,485.	1,497.	ppb	2.05	200000.	
25 Mg	5,030.	1,006.	ppb	1.43	200000.	
27 Al	2,008.	401.6	ppb	1.88	200000.	
28 Si	4,514.	902.8	ppb	19.85	#VALUE!	
29 Si	310.3	62.06	ppb	300.19	10000.	
39 K	9,960.	1,992.	ppb	2.29	200000.	
43 Ca	2,694.	538.8	ppb	1.39	#VALUE!	
44 Ca	2,136.	427.2	ppb	2.46	200000.	
51 V	504.	100.8	ppb	0.91	1000.	
52 Cr	195.65	39.13	ppb	1.22	1000.	
53 Cr	263.7	52.74	ppb	1.57	#VALUE!	
55 Mn	503.5	100.7	ppb	1.70	1000.	
56 Fe	1,061.	212.2	ppb	1.21	#VALUE!	
57 Fe	956.5	191.3	ppb	3.22	100000.	
59 Co	494.2	98.84	ppb	1.56	1000.	
60 Ni	497.95	99.59	ppb	1.48	1000.	
63 Cu	248.35	49.67	ppb	1.34	#VALUE!	
65 Cu	249.7	49.94	ppb	1.63	1000.	
66 Zn	488.05	97.61	ppb	1.77	1000.	
68 Zn	525.	105.	ppb	1.56	#VALUE!	
75 As	100.7	20.14	ppb	1.92	1000.	
82 Se	100.05	20.01	ppb	2.08	1000.	
88 Sr	511.	102.2	ppb	2.28	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	302.2	60.44	ppb	1.47	1000.	
107 Ag	51.1	10.22	ppb	0.81	500.	
109 Ag	51.3	10.26	ppb	0.69	#VALUE!	
111 Cd	260.7	52.14	ppb	1.59	#VALUE!	
114 Cd	261.	52.2	ppb	1.31	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	483.	96.6	ppb	1.10	1000.	
120 Sn	485.45	97.09	ppb	0.98	#VALUE!	
121 Sb	99.6	19.92	ppb	1.39	#VALUE!	
123 Sb	98.8	19.76	ppb	0.84	1000.	
135 Ba	1,942.5	388.5	ppb	1.40	1000.	
137 Ba	1,944.	388.8	ppb	1.07	#VALUE!	
182 W	105.85	21.17	ppb ---		#VALUE!	
203 Tl	99.35	19.87	ppb	2.06	1000.	
205 Tl	100.1	20.02	ppb	2.10	#VALUE!	
208 Pb	101.35	20.27	ppb	1.99	1000.	
232 Th	1.6165	0.3233	ppb	10.00	1000.	
238 U	97.25	19.45	ppb	2.00	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2946525.30	1.26	3254874.00	90.5	69.5 - 130	
45 Sc	2543982.50	1.33	2845192.80	89.4	69.5 - 130	
72 Ge	556983.88	0.94	628164.81	88.7	69.5 - 130	
159 Tb	4637499.50	0.57	4911963.50	94.4	69.5 - 130	
209 Bi	2629516.80	1.55	2733046.80	96.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000162

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\103SMPL.D\103SMPL.D#
Date Acquired: Jul 23 2014 05:34 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-009P
Misc Info: DILUTION 1.6/8
Vial Number: 3106
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	46.825	9.365	ppb	0.75	100.	
11 B	447.35	89.47	ppb	0.14	1000.	
23 Na	7,605.	1,521.	ppb	0.22	200000.	
25 Mg	5,100.	1,020.	ppb	0.94	200000.	
27 Al	2,062.	412.4	ppb	0.62	200000.	
28 Si	4,551.5	910.3	ppb	6.66	#VALUE!	
29 Si	498.65	99.73	ppb	90.20	10000.	
39 K	10,125.	2,025.	ppb	1.19	200000.	
43 Ca	2,945.	589.	ppb	5.73	#VALUE!	
44 Ca	2,172.5	434.5	ppb	1.07	200000.	
51 V	512.	102.4	ppb	0.73	1000.	
52 Cr	199.9	39.98	ppb	0.13	1000.	
53 Cr	264.5	52.9	ppb	1.43	#VALUE!	
55 Mn	514.5	102.9	ppb	0.38	1000.	
56 Fe	1,083.5	216.7	ppb	0.69	#VALUE!	
57 Fe	1,004.	200.8	ppb	1.71	100000.	
59 Co	505.	101.	ppb	0.58	1000.	
60 Ni	508.5	101.7	ppb	0.45	1000.	
63 Cu	255.8	51.16	ppb	0.14	#VALUE!	
65 Cu	256.5	51.3	ppb	0.69	1000.	
66 Zn	500.	100.	ppb	1.01	1000.	
68 Zn	532.5	106.5	ppb	0.27	#VALUE!	
75 As	102.4	20.48	ppb	0.62	1000.	
82 Se	101.5	20.3	ppb	1.80	1000.	
88 Sr	515.	103.	ppb	1.35	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	303.95	60.79	ppb	0.47	1000.	
107 Ag	52.75	10.55	ppb	0.39	500.	
109 Ag	52.45	10.49	ppb	0.84	#VALUE!	
111 Cd	263.95	52.79	ppb	0.37	#VALUE!	
114 Cd	263.95	52.79	ppb	0.18	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	482.8	96.56	ppb	1.04	1000.	
120 Sn	482.	96.4	ppb	1.09	#VALUE!	
121 Sb	99.6	19.92	ppb	1.70	#VALUE!	
123 Sb	99.15	19.83	ppb	0.68	1000.	
135 Ba	1,967.	393.4	ppb	1.28	1000.	
137 Ba	1,970.5	394.1	ppb	1.14	#VALUE!	
182 W	105.45	21.09	ppb ---		#VALUE!	
203 Tl	100.75	20.15	ppb	0.76	1000.	
205 Tl	101.55	20.31	ppb	0.59	#VALUE!	
208 Pb	103.2	20.64	ppb	0.82	1000.	
232 Th	1.071	0.2142	ppb	8.60	1000.	
238 U	97.8	19.56	ppb	1.09	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2981792.80	0.60	3254874.00	91.6	69.5 - 130	
45 Sc	2557554.50	0.74	2845192.80	89.9	69.5 - 130	
72 Ge	560790.00	0.69	628164.81	89.3	69.5 - 130	
159 Tb	4696205.00	0.92	4911963.50	95.6	69.5 - 130	
209 Bi	2628982.00	0.77	2733046.80	96.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000163

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\104SMPL.D\104SMPL.D#
Date Acquired: Jul 23 2014 05:38 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBSHG15IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 3107
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.026	0.0052	ppb	48.18	100.	
11 B	9.63	1.926	ppb	13.68	1000.	
23 Na	28.1	5.62	ppb	1.42	200000.	
25 Mg	14.38	2.876	ppb	4.08	200000.	
27 Al	8.575	1.715	ppb	3.60	200000.	
28 Si	175.9	35.18	ppb	387.15	#VALUE!	
29 Si	-3,153.	-630.6	ppb	26.66	10000.	LOW
39 K	-38.75	-7.75	ppb	55.24	200000.	
43 Ca	78.	15.6	ppb	24.28	#VALUE!	
44 Ca	-3.8165	-0.7633	ppb	258.74	200000.	
51 V	1.138	0.2276	ppb	72.36	1000.	
52 Cr	1.8125	0.3625	ppb	0.80	1000.	
53 Cr	70.4	14.08	ppb	6.61	#VALUE!	
55 Mn	0.6795	0.1359	ppb	13.25	1000.	
56 Fe	40.445	8.089	ppb	21.68	#VALUE!	
57 Fe	8.16	1.632	ppb	90.07	100000.	
59 Co	-0.0233	-0.0047	ppb	275.68	1000.	
60 Ni	0.3907	0.0781	ppb	21.36	1000.	
63 Cu	-0.1096	-0.0219	ppb	104.11	#VALUE!	
65 Cu	-0.0163	-0.0033	ppb	552.39	1000.	
66 Zn	1.615	0.323	ppb	7.44	1000.	
68 Zn	2.5045	0.5009	ppb	31.48	#VALUE!	
75 As	0.6885	0.1377	ppb	95.21	1000.	
82 Se	-1.2735	-0.2547	ppb	45.70	1000.	
88 Sr	0.1674	0.0335	ppb	30.30	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	0.3903	0.0781	ppb	13.62	1000.	
107 Ag	-0.0166	-0.0033	ppb	53.56	500.	
109 Ag	0.001	0.0002	ppb	487.84	#VALUE!	
111 Cd	-0.4346	-0.0869	ppb	21.10	#VALUE!	
114 Cd	-0.0122	-0.0024	ppb	358.27	1000.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	21.1	4.22	ppb	2.40	1000.	
120 Sn	21.515	4.303	ppb	0.85	#VALUE!	
121 Sb	0.0772	0.0154	ppb	50.71	#VALUE!	
123 Sb	0.1049	0.021	ppb	14.90	1000.	
135 Ba	0.3583	0.0717	ppb	13.96	1000.	
137 Ba	0.3296	0.0659	ppb	20.27	#VALUE!	
182 W	0.2928	0.0586	ppb	---	#VALUE!	
203 Tl	-0.0005	-0.0001	ppb	3143.10	1000.	
205 Tl	0.0345	0.0069	ppb	42.53	#VALUE!	
208 Pb	0.3199	0.064	ppb	4.70	1000.	
232 Th	0.3593	0.0719	ppb	14.91	1000.	
238 U	0.0153	0.0031	ppb	68.57	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2931968.50	1.68	3254874.00	90.1	69.5 - 130	
45 Sc	2565736.50	1.92	2845192.80	90.2	69.5 - 130	
72 Ge	561402.56	1.43	628164.81	89.4	69.5 - 130	
159 Tb	4673359.50	1.12	4911963.50	95.1	69.5 - 130	
209 Bi	2641361.80	1.79	2733046.80	96.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000164

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\105SMPL.D\105SMPL.D#
Date Acquired: Jul 23 2014 05:41 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSOHG15IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 3108
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	45.095	9.019	ppb	1.22	100.	
11 B	426.1	85.22	ppb	1.39	1000.	
23 Na	7,140.	1,428.	ppb	0.80	200000.	
25 Mg	4,781.5	956.3	ppb	0.80	200000.	
27 Al	1,965.	393.	ppb	0.87	200000.	
28 Si	2,132.	426.4	ppb	32.81	#VALUE!	
29 Si	-1,505.5	-301.1	ppb	18.09	10000.	LOW
39 K	9,495.	1,899.	ppb	1.08	200000.	
43 Ca	2,707.	541.4	ppb	2.04	#VALUE!	
44 Ca	2,032.	406.4	ppb	1.32	200000.	
51 V	486.45	97.29	ppb	0.37	1000.	
52 Cr	191.8	38.36	ppb	0.65	1000.	
53 Cr	259.15	51.83	ppb	0.22	#VALUE!	
55 Mn	482.45	96.49	ppb	0.73	1000.	
56 Fe	1,045.5	209.1	ppb	0.53	#VALUE!	
57 Fe	954.5	190.9	ppb	1.89	100000.	
59 Co	481.1	96.22	ppb	0.69	1000.	
60 Ni	484.45	96.89	ppb	0.86	1000.	
63 Cu	268.8	53.76	ppb	0.56	#VALUE!	
65 Cu	270.45	54.09	ppb	0.94	1000.	
66 Zn	473.3	94.66	ppb	0.61	1000.	
68 Zn	510.5	102.1	ppb	0.28	#VALUE!	
75 As	97.35	19.47	ppb	0.28	1000.	
82 Se	97.35	19.47	ppb	2.81	1000.	
88 Sr	483.2	96.64	ppb	1.32	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	282.15	56.43	ppb	0.99	1000.	
107 Ag	49.335	9.867	ppb	2.01	500.	
109 Ag	49.55	9.91	ppb	1.39	#VALUE!	
111 Cd	235.15	47.03	ppb	0.83	#VALUE!	
114 Cd	235.35	47.07	ppb	0.17	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	473.05	94.61	ppb	0.76	1000.	
120 Sn	474.15	94.83	ppb	0.65	#VALUE!	
121 Sb	94.95	18.99	ppb	0.50	#VALUE!	
123 Sb	94.05	18.81	ppb	0.68	1000.	
135 Ba	1,889.	377.8	ppb	0.75	1000.	
137 Ba	1,891.	378.2	ppb	0.76	#VALUE!	
182 W	91.55	18.31	ppb ---		#VALUE!	
203 Tl	95.85	19.17	ppb	1.09	1000.	
205 Tl	96.35	19.27	ppb	0.50	#VALUE!	
208 Pb	98.7	19.74	ppb	0.76	1000.	
232 Th	0.5425	0.1085	ppb	5.34	1000.	
238 U	93.5	18.7	ppb	0.22	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2956009.30	0.97	3254874.00	90.8	69.5 - 130	
45 Sc	2554611.80	1.02	2845192.80	89.8	69.5 - 130	
72 Ge	558573.63	1.08	628164.81	88.9	69.5 - 130	
159 Tb	4646346.00	0.68	4911963.50	94.6	69.5 - 130	
209 Bi	2618650.50	0.80	2733046.80	95.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000165

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\106SMPL.D\106SMPL.D#
Date Acquired: Jul 23 2014 05:45 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-001
Misc Info: DILUTION 1.6/8
Vial Number: 3109
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	6.19	1.238	ppb	3.55	100.	
11 B	51.1	10.22	ppb	1.49	1000.	
23 Na	10,220.	2,044.	ppb	2.62	200000.	
25 Mg	101,950.	20,390.	ppb	2.53	200000.	
27 Al	373,850.	74,770.	ppb	3.09	200000.	
28 Si	-3,186.	-637.2	ppb	9.14	#VALUE!	
29 Si	-10,950.	-2,190.	ppb	10.82	10000.	LOW
39 K	42,750.	8,550.	ppb	2.35	200000.	
43 Ca	95,400.	19,080.	ppb	2.71	#VALUE!	
44 Ca	92,050.	18,410.	ppb	2.60	200000.	
51 V	3,357.5	671.5	ppb	2.90	1000.	
52 Cr	397.45	79.49	ppb	2.68	1000.	
53 Cr	433.05	86.61	ppb	2.69	#VALUE!	
55 Mn	12,375.	2,475.	ppb	2.91	1000.	>LDR
56 Fe	899,000.	179,800.	ppb	2.90	#VALUE!	
57 Fe	860,000.	172,000.	ppb	2.88	100000.	>LDR
59 Co	356.3	71.26	ppb	2.59	1000.	
60 Ni	156.45	31.29	ppb	2.89	1000.	
63 Cu	1,919.	383.8	ppb	3.32	#VALUE!	
65 Cu	1,988.	397.6	ppb	2.31	1000.	
66 Zn	1,460.	292.	ppb	2.83	1000.	
68 Zn	1,470.	294.	ppb	3.08	#VALUE!	
75 As	8.18	1.636	ppb	7.37	1000.	
82 Se	18.25	3.65	ppb	1.67	1000.	
88 Sr	856.	171.2	ppb	3.06	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	7.74	1.548	ppb	1.89	1000.	
107 Ag	0.2465	0.0493	ppb	8.16	500.	
109 Ag	0.2332	0.0466	ppb	12.64	#VALUE!	
111 Cd	1.7225	0.3445	ppb	4.50	#VALUE!	
114 Cd	0.7995	0.1599	ppb	5.69	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.21	5.042	ppb	3.04	1000.	
120 Sn	25.285	5.057	ppb	4.32	#VALUE!	
121 Sb	0.5415	0.1083	ppb	8.21	#VALUE!	
123 Sb	0.563	0.1126	ppb	4.75	1000.	
135 Ba	1,927.5	385.5	ppb	3.75	1000.	
137 Ba	1,917.	383.4	ppb	3.78	#VALUE!	
182 W	0.688	0.1376	ppb ---		#VALUE!	
203 Tl	9.	1.8	ppb	4.10	1000.	
205 Tl	9.22	1.844	ppb	4.22	#VALUE!	
208 Pb	104.65	20.93	ppb	3.32	1000.	
232 Th	7.5	1.5	ppb	2.35	1000.	
238 U	5.21	1.042	ppb	2.31	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2804889.80	3.20	3254874.00	86.2	69.5 - 130	
45 Sc	3278155.00	3.70	2845192.80	115.2	69.5 - 130	
72 Ge	555792.06	3.93	628164.81	88.5	69.5 - 130	
159 Tb	4513520.50	3.91	4911963.50	91.9	69.5 - 130	
209 Bi	2447739.80	2.46	2733046.80	89.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000166

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\107SMPL.D\107SMPL.D#
Date Acquired: Jul 23 2014 05:48 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-002
Misc Info: DILUTION 1.6/8
Vial Number: 3110
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.73	1.146	ppb	2.13	100.	
11 B	57.75	11.55	ppb	2.83	1000.	
23 Na	13,850.	2,770.	ppb	1.12	200000.	
25 Mg	101,350.	20,270.	ppb	1.01	200000.	
27 Al	421,200.	84,240.	ppb	1.20	200000.	
28 Si	-3,342.5	-668.5	ppb	14.87	#VALUE!	
29 Si	-8,550.	-1,710.	ppb	9.23	10000.	LOW
39 K	26,155.	5,231.	ppb	1.10	200000.	
43 Ca	61,800.	12,360.	ppb	0.29	#VALUE!	
44 Ca	60,150.	12,030.	ppb	0.64	200000.	
51 V	3,291.	658.2	ppb	0.95	1000.	
52 Cr	537.	107.4	ppb	1.18	1000.	
53 Cr	561.	112.2	ppb	0.76	#VALUE!	
55 Mn	10,810.	2,162.	ppb	0.94	1000.	>LDR
56 Fe	894,500.	178,900.	ppb	0.91	#VALUE!	
57 Fe	853,000.	170,600.	ppb	1.22	100000.	>LDR
59 Co	393.35	78.67	ppb	1.50	1000.	
60 Ni	196.6	39.32	ppb	1.08	1000.	
63 Cu	1,985.	397.	ppb	1.35	#VALUE!	
65 Cu	2,079.	415.8	ppb	1.63	1000.	
66 Zn	1,339.	267.8	ppb	1.15	1000.	
68 Zn	1,345.	269.	ppb	1.57	#VALUE!	
75 As	12.465	2.493	ppb	7.70	1000.	
82 Se	18.16	3.632	ppb	12.33	1000.	
88 Sr	635.5	127.1	ppb	1.27	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	8.605	1.721	ppb	0.90	1000.	
107 Ag	0.3944	0.0789	ppb	7.33	500.	
109 Ag	0.4025	0.0805	ppb	4.93	#VALUE!	
111 Cd	1.7725	0.3545	ppb	4.78	#VALUE!	
114 Cd	0.7255	0.1451	ppb	4.85	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.035	5.007	ppb	1.68	1000.	
120 Sn	25.165	5.033	ppb	2.69	#VALUE!	
121 Sb	0.5225	0.1045	ppb	9.60	#VALUE!	
123 Sb	0.5335	0.1067	ppb	18.05	1000.	
135 Ba	1,464.	292.8	ppb	1.66	1000.	
137 Ba	1,469.5	293.9	ppb	1.92	#VALUE!	
182 W	0.531	0.1062	ppb ---		#VALUE!	
203 Tl	6.535	1.307	ppb	1.94	1000.	
205 Tl	6.645	1.329	ppb	3.12	#VALUE!	
208 Pb	70.75	14.15	ppb	0.79	1000.	
232 Th	8.3	1.66	ppb	1.53	1000.	
238 U	5.12	1.024	ppb	1.05	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2715592.30	0.91	3254874.00	83.4	69.5 - 130	
45 Sc	3060648.30	0.83	2845192.80	107.6	69.5 - 130	
72 Ge	524346.38	0.74	628164.81	83.5	69.5 - 130	
159 Tb	4425492.50	1.06	4911963.50	90.1	69.5 - 130	
209 Bi	2441336.00	0.91	2733046.80	89.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000167

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\108_CCV.D\108_CCV.D#
Date Acquired: Jul 23 2014 05:52 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	24.08	ppb	1.24	25	96.32	
11 B	24.78	ppb	2.27	25	99.12	
23 Na	4,986.	ppb	0.47	5,000	99.72	
25 Mg	5,057.	ppb	0.57	5,000	101.14	
27 Al	520.9	ppb	1.54	500	104.18	
28 Si	195.6	ppb	39.76	500	39.12	
29 Si	666.2	ppb	11.61	500	133.24	Fail
39 K	4,963.	ppb	0.61	5,000	99.26	
43 Ca	4,946.	ppb	1.19	5,000	98.92	
44 Ca	5,039.	ppb	0.83	5,000	100.78	
51 V	24.25	ppb	1.04	25	97	
52 Cr	24.43	ppb	0.71	25	97.72	
53 Cr	23.7	ppb	1.55	25	94.8	
55 Mn	25.12	ppb	0.68	25	100.48	
56 Fe	4,978.	ppb	0.30	5,000	99.56	
57 Fe	5,075.	ppb	0.53	5,000	101.5	
59 Co	24.54	ppb	0.15	25	98.16	
60 Ni	23.93	ppb	0.50	25	95.72	
63 Cu	24.48	ppb	1.65	25	97.92	
65 Cu	24.39	ppb	1.51	25	97.56	
66 Zn	24.51	ppb	1.42	25	98.04	
68 Zn	24.96	ppb	0.97	25	99.84	
75 As	24.22	ppb	0.73	25	96.88	
82 Se	24.3	ppb	2.32	25	97.2	
88 Sr	25.44	ppb	1.11	25	101.76	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.55	ppb	0.81	25	102.2	
107 Ag	26.09	ppb	0.96	25	104.36	
109 Ag	26.08	ppb	0.69	25	104.32	
111 Cd	26.3	ppb	0.70	25	105.2	
114 Cd	26.39	ppb	0.59	25	105.56	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.85	ppb	0.69	25	95.4	
120 Sn	23.96	ppb	0.34	25	95.84	
121 Sb	23.71	ppb	0.74	25	94.84	
123 Sb	23.88	ppb	0.39	25	95.52	
135 Ba	24.17	ppb	1.09	25	96.68	
137 Ba	24.19	ppb	0.51	25	96.76	
182 W	25.33	ppb	0.94	25	101.32	
203 Tl	24.25	ppb	0.24	25	97	
205 Tl	24.48	ppb	0.25	25	97.92	
208 Pb	24.48	ppb	0.28	25	97.92	
232 Th	22.97	ppb	2.22	25	91.88	
238 U	24.21	ppb	0.85	25	96.84	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2708679.30	1.04	3254874.00	83.2	80 - 120.4	
45 Sc	2345811.80	0.51	2845192.80	82.4	80 - 120.4	
72 Ge	518319.53	0.78	628164.81	82.5	80 - 120.4	
159 Tb	4525966.00	0.62	4911963.50	92.1	80 - 120.4	
209 Bi	2639323.80	0.84	2733046.80	96.6	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000168

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG23A.B\109_CCB.D\109_CCB.D#
Date Acquired: Jul 23 2014 05:55 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 23 2014 12:43 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0042	ppb	21.08	1.00	
11 B	0.551	ppb	21.72	1.00	
23 Na	-0.2294	ppb	68.61	1.00	
25 Mg	1.865	ppb	10.97	1.00	
27 Al	5.211	ppb	8.96	1.00	
28 Si	-322.6	ppb	21.11	1.00	
29 Si	181.7	ppb	108.81	1.00	Fail
39 K	12.14	ppb	15.85	1.00	
43 Ca	-0.4489	ppb	1649.40	1.00	
44 Ca	-13.68	ppb	23.18	1.00	
51 V	0.0039	ppb	578.99	1.00	
52 Cr	-0.0193	ppb	98.65	1.00	
53 Cr	-0.4661	ppb	36.84	1.00	
55 Mn	0.3244	ppb	13.98	1.00	
56 Fe	0.4248	ppb	2481.20	1.00	
57 Fe	14.91	ppb	34.18	1.00	
59 Co	-0.0123	ppb	16.67	1.00	
60 Ni	-0.0059	ppb	285.76	1.00	
63 Cu	-0.0658	ppb	13.44	1.00	
65 Cu	-0.0475	ppb	34.46	1.00	
66 Zn	0.4347	ppb	5.32	1.00	
68 Zn	1.172	ppb	9.25	1.00	
75 As	0.0565	ppb	199.19	1.00	
82 Se	-0.6464	ppb	25.53	1.00	
88 Sr	0.0132	ppb	71.48	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0438	ppb	8.01	1.00	
107 Ag	-0.0008	ppb	550.83	1.00	
109 Ag	0.0026	ppb	144.07	1.00	
111 Cd	0.0902	ppb	29.03	1.00	
114 Cd	0.0041	ppb	51.33	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0606	ppb	38.55	1.00	
120 Sn	0.0664	ppb	17.41	1.00	
121 Sb	0.0204	ppb	33.09	1.00	
123 Sb	0.0201	ppb	44.84	1.00	
135 Ba	0.0238	ppb	22.74	1.00	
137 Ba	0.0359	ppb	31.68	1.00	
182 W	0.0924	ppb	15.05	1.00	
203 Tl	0.0067	ppb	67.76	1.00	
205 Tl	0.013	ppb	40.61	1.00	
208 Pb	-0.0035	ppb	6.15	1.00	
232 Th	0.1586	ppb	23.74	1.00	
238 U	0.0021	ppb	48.90	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2792269.80	1.17	3254874.00	85.8	79.5 - 120	
45 Sc	2409610.30	0.89	2845192.80	84.7	79.5 - 120	
72 Ge	533049.75	1.07	628164.81	84.9	79.5 - 120	
159 Tb	4629303.50	1.03	4911963.50	94.2	79.5 - 120	
209 Bi	2692043.30	1.80	2733046.80	98.5	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG23A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000169

KATAHDIN ANALYTICAL SERVICES, INC.
METALS ANALYSIS RUN INFORMATION SHEET

INSTR. ID: J-Agilent 7500 **ANALYST:** SAM **ANALYSIS DATE:** 07-28-14

FILE NAME: J4628A

REVIEWED
MMM 7-29-14
KATAHDIN ANALYTICAL
METALS SECTION

METHOD:

ICP	ICP-MS	CVAA
☐ 200.7	☑ 200.8	☐ 245.__
☐ 6010B	☑ 6020	☐ 747___
☐ CLP	☐ CLP	☐ CLP
☐ _____	☐ _____	☐ _____

STANDARDS USED:

Standard Name	Standard ID	Prep Date	Expiration Date	Standard Conc.
Cal-Blank/ICB/CCB	MW15012	07-24-14	07-24-15	0 ug/L
Cal-Std 1	MW15013	07-25-14	08-08-14	varies by element
2	MW15014			
3	MW15015			
4	MW15016			
ICV	MW15010	07-22-14	10-22-14	
PQL	MW14995	07-15-14	08-08-14	
ICSA	MW15007	07-22-14	07-29-14	
ICSAB	MW15008			
CCV	MW15011	07-23-14	08-08-14	
Internal Std	MW15001	07-17-14	10-17-14	1 mg/L

Additional Comments and Notes:

*closing PQL failed for calcium - accepted sample results greater than 10 times the PQL.

MMM 7-29-14

INSTRUMENT RUNLOG

Instrument: AGILENT 7500

SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
6020 Tune	1	JHG28A	7/28/2014 12:03:0	12:03	EAM
200.8 Tune	1	JHG28A	7/28/2014 12:05:0	12:05	EAM
Cal Blank	1	JHG28A	7/28/2014 12:34:0	12:34	EAM
Cal Std 1	1	JHG28A	7/28/2014 12:37:0	12:37	EAM
Cal Std 2	1	JHG28A	7/28/2014 12:40:0	12:40	EAM
Cal Std 3	1	JHG28A	7/28/2014 12:43:0	12:43	EAM
Cal Std 4	1	JHG28A	7/28/2014 12:46:0	12:46	EAM
ICV	1	JHG28A	7/28/2014 12:49:0	12:49	EAM
ICB	1	JHG28A	7/28/2014 12:53:0	12:53	EAM
PQL	1	JHG28A	7/28/2014 12:56:0	12:56	EAM
ICSA	1	JHG28A	7/28/2014 12:59:0	12:59	EAM
ICSAB	1	JHG28A	7/28/2014 1:02:00	13:02	EAM
Blank	1	JHG28A	7/28/2014 1:06:00	13:06	EAM
CCV	1	JHG28A	7/28/2014 1:09:00	13:09	EAM
CCB	1	JHG28A	7/28/2014 1:12:00	13:12	EAM
SH4625-006	1	JHG28A	7/28/2014 1:15:00	13:15	EAM
SH4625-9 UNDIG	1	JHG28A	7/28/2014 1:19:00	13:19	EAM
SH4952-005	1	JHG28A	7/28/2014 1:22:00	13:22	EAM
CCV	1	JHG28A	7/28/2014 1:25:00	13:25	EAM
CCB	1	JHG28A	7/28/2014 1:29:00	13:29	EAM
SH4862-011	5	JHG28A	7/28/2014 1:32:00	13:32	EAM
SH4862-011L	25	JHG28A	7/28/2014 1:35:00	13:35	EAM
SH4862-011A	5	JHG28A	7/28/2014 1:38:00	13:38	EAM
SH4862-029S	25	JHG28A	7/28/2014 1:42:00	13:42	EAM
SH4862-029P	25	JHG28A	7/28/2014 1:45:00	13:45	EAM
PBWHG25IMW1	1	JHG28A	7/28/2014 1:48:00	13:48	EAM
LCSWHG25IMW1	5	JHG28A	7/28/2014 1:51:00	13:51	EAM
SH5410-001	1	JHG28A	7/28/2014 1:54:00	13:54	EAM
SH5495-002	1	JHG28A	7/28/2014 1:58:00	13:58	EAM
SH5553-001	1	JHG28A	7/28/2014 2:01:00	14:01	EAM
CCV	1	JHG28A	7/28/2014 2:04:00	14:04	EAM
CCB	1	JHG28A	7/28/2014 2:08:00	14:08	EAM
SH5461-002	5	JHG28A	7/28/2014 2:11:00	14:11	EAM
SH5461-005	5	JHG28A	7/28/2014 2:14:00	14:14	EAM
SH5461-014	5	JHG28A	7/28/2014 2:18:00	14:18	EAM
SH5461-015	5	JHG28A	7/28/2014 2:21:00	14:21	EAM
SH5581-001	1	JHG28A	7/28/2014 2:24:00	14:24	EAM
SH5588-001	1	JHG28A	7/28/2014 2:28:00	14:28	EAM
PBSHG15IMS1	5	JHG28A	7/28/2014 2:31:00	14:31	EAM
LCSOHG15IMS1	5	JHG28A	7/28/2014 2:35:00	14:35	EAM
SH4986-001	5	JHG28A	7/28/2014 2:38:00	14:38	EAM
SH4986-002	5	JHG28A	7/28/2014 2:41:00	14:41	EAM
CCV	1	JHG28A	7/28/2014 2:45:00	14:45	EAM
CCB	1	JHG28A	7/28/2014 2:48:00	14:48	EAM

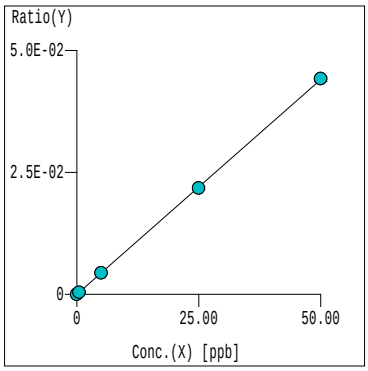
SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
SH4986-003	5	JHG28A	7/28/2014 2:52:00	14:52	EAM
SH4986-004	5	JHG28A	7/28/2014 2:55:00	14:55	EAM
SH4986-005	5	JHG28A	7/28/2014 2:59:00	14:59	EAM
SH4986-006	5	JHG28A	7/28/2014 3:02:00	15:02	EAM
SH4986-007	5	JHG28A	7/28/2014 3:06:00	15:06	EAM
SH4986-008	5	JHG28A	7/28/2014 3:09:00	15:09	EAM
SH4986-008L	25	JHG28A	7/28/2014 3:13:00	15:13	EAM
SH4986-008A	5	JHG28A	7/28/2014 3:16:00	15:16	EAM
SH4986-008S	5	JHG28A	7/28/2014 3:20:00	15:20	EAM
SH4986-008P	5	JHG28A	7/28/2014 3:23:00	15:23	EAM
CCV	1	JHG28A	7/28/2014 3:27:00	15:27	EAM
CCB	1	JHG28A	7/28/2014 3:30:00	15:30	EAM
PBWHG17IMW2	5	JHG28A	7/28/2014 3:34:00	15:34	EAM
LCSWHG17IMW2	5	JHG28A	7/28/2014 3:37:00	15:37	EAM
SH5289-001	5	JHG28A	7/28/2014 3:41:00	15:41	EAM
SH5289-005	5	JHG28A	7/28/2014 3:44:00	15:44	EAM
SH5289-009	5	JHG28A	7/28/2014 3:47:00	15:47	EAM
SH5289-013	5	JHG28A	7/28/2014 3:51:00	15:51	EAM
SH5289-013L	25	JHG28A	7/28/2014 3:54:00	15:54	EAM
SH5289-013A	5	JHG28A	7/28/2014 3:57:00	15:57	EAM
SH5289-013S	5	JHG28A	7/28/2014 4:01:00	16:01	EAM
SH5289-013P	5	JHG28A	7/28/2014 4:04:00	16:04	EAM
CCV	1	JHG28A	7/28/2014 4:08:00	16:08	EAM
CCB	1	JHG28A	7/28/2014 4:11:00	16:11	EAM
SH5289-017	5	JHG28A	7/28/2014 4:15:00	16:15	EAM
SH5289-021	5	JHG28A	7/28/2014 4:18:00	16:18	EAM
SH5289-023	5	JHG28A	7/28/2014 4:21:00	16:21	EAM
SH5289-027	5	JHG28A	7/28/2014 4:25:00	16:25	EAM
SH5289-031	5	JHG28A	7/28/2014 4:28:00	16:28	EAM
PBWHG24IMW1	5	JHG28A	7/28/2014 4:32:00	16:32	EAM
LCSWHG24IMW1	5	JHG28A	7/28/2014 4:35:00	16:35	EAM
SH5505-001	5	JHG28A	7/28/2014 4:39:00	16:39	EAM
SH5505-002	5	JHG28A	7/28/2014 4:42:00	16:42	EAM
SH5505-003	5	JHG28A	7/28/2014 4:46:00	16:46	EAM
CCV	1	JHG28A	7/28/2014 4:49:00	16:49	EAM
CCB	1	JHG28A	7/28/2014 4:52:00	16:52	EAM
SH5505-004	5	JHG28A	7/28/2014 4:56:00	16:56	EAM
SH5505-005	5	JHG28A	7/28/2014 4:59:00	16:59	EAM
SH5505-006	5	JHG28A	7/28/2014 5:03:00	17:03	EAM
SH5505-007	5	JHG28A	7/28/2014 5:06:00	17:06	EAM
SH5505-008	5	JHG28A	7/28/2014 5:09:00	17:09	EAM
SH5505-009	5	JHG28A	7/28/2014 5:13:00	17:13	EAM
SH5505-010	5	JHG28A	7/28/2014 5:16:00	17:16	EAM
SH5505-010L	25	JHG28A	7/28/2014 5:20:00	17:20	EAM
SH5505-010A	5	JHG28A	7/28/2014 5:23:00	17:23	EAM
SH5505-010S	5	JHG28A	7/28/2014 5:27:00	17:27	EAM
CCV	1	JHG28A	7/28/2014 5:30:00	17:30	EAM

SAMPLE ID	DF	FILE	DATE	TIME	ANALYST
CCB	1	JHG28A	7/28/2014 5:34:00	17:34	EAM
SH5505-010P	5	JHG28A	7/28/2014 5:37:00	17:37	EAM
CCV	1	JHG28A	7/28/2014 5:41:00	17:41	EAM
CCB	1	JHG28A	7/28/2014 5:44:00	17:44	EAM
PQL	1	JHG28A	7/28/2014 5:48:00	17:48	EAM
CCV	1	JHG28A	7/28/2014 5:51:00	17:51	EAM
CCB	1	JHG28A	7/28/2014 5:55:00	17:55	EAM

=== Graph Detail ===

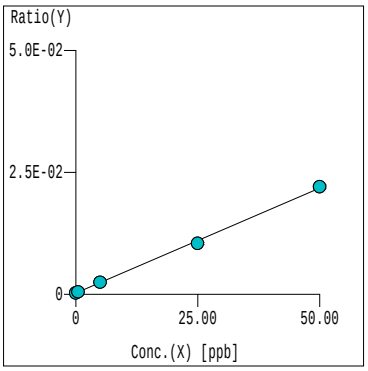
Cal. Date: 07/28/2014, 12:48

Step	Mass	Element	ISTD	Unit
(1)	9	Be	6	ppb



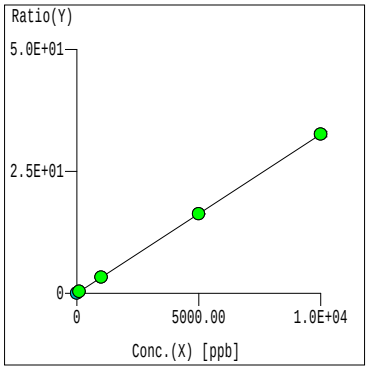
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 8.813E-004*X +1.766E-006
X = 1.135E+003*Y -2.004E-003
DL = 2.187E-03 ppb
BEC = 2.004E-03 ppb

Step	Mass	Element	ISTD	Unit
(1)	11	B	6	ppb



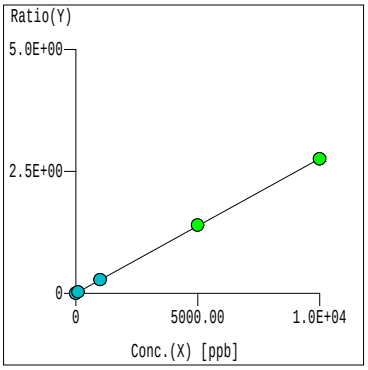
Curve Fit: Y=aX+[blank]
r = 0.9994
Y = 4.301E-004*X +2.738E-004
X = 2.325E+003*Y -6.367E-001
DL = 9.108E-02 ppb
BEC = 6.367E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	23	Na	45	ppb



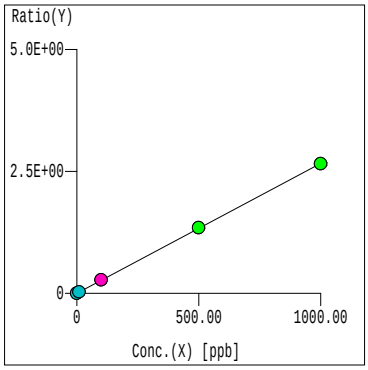
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 3.260E-003*X +3.876E-002
X = 3.068E+002*Y -1.189E+001
DL = 8.171E-01 ppb
BEC = 11.89 ppb

Step	Mass	Element	ISTD	Unit
(1)	25	Mg	45	ppb



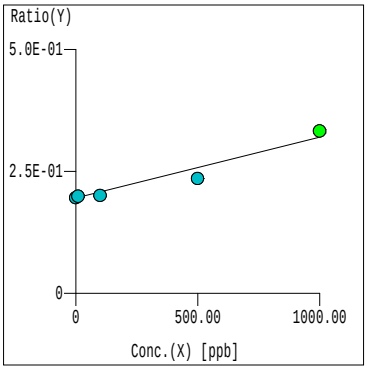
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.765E-004*X +5.058E-005
X = 3.616E+003*Y -1.829E-001
DL = 1.831E-01 ppb
BEC = 1.829E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	27	Al	45	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.662E-003*X +1.255E-003
X = 3.756E+002*Y -4.712E-001
DL = 9.895E-02 ppb
BEC = 4.712E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	29	Si	45	ppb

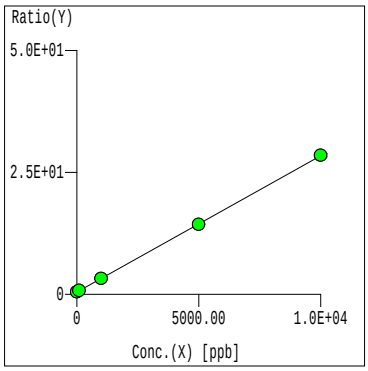


Curve Fit: Y=aX+[blank]
r = 0.9761
Y = 1.247E-004*X +1.957E-001
X = 8.017E+003*Y -1.569E+003
DL = 60.11 ppb
BEC = 1569 ppb

=== Graph Detail ===

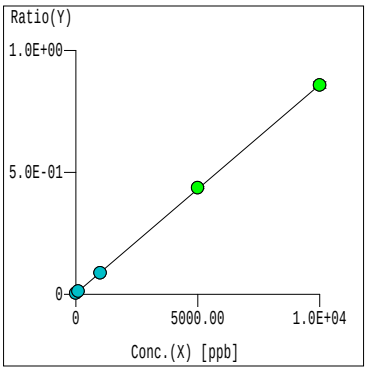
Cal. Date: 07/28/2014, 12:48

Step	Mass	Element	ISTD	Unit
(1)	39	K	45	ppb



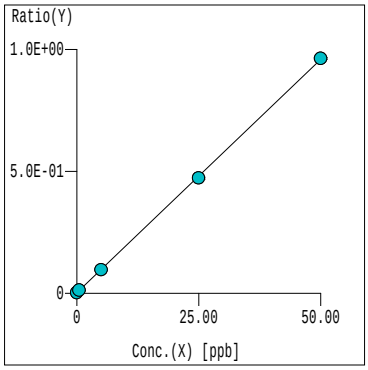
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.795E-003*X +4.925E-001
X = 3.578E+002*Y -1.762E+002
DL = 1.149 ppb
BEC = 176.2 ppb

Step	Mass	Element	ISTD	Unit
(1)	44	Ca	45	ppb



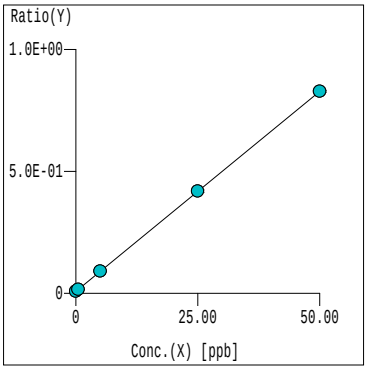
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 8.558E-005*X +4.528E-003
X = 1.169E+004*Y -5.292E+001
DL = 5.144 ppb
BEC = 52.92 ppb

Step	Mass	Element	ISTD	Unit
(1)	51	V	72	ppb



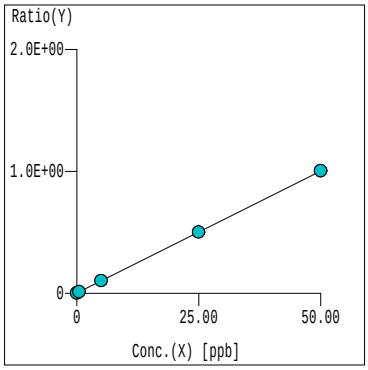
Curve Fit: Y=aX+[blank]
r = 0.9999
Y = 1.912E-002*X +2.860E-003
X = 5.229E+001*Y -1.496E-001
DL = 1.994E-01 ppb
BEC = 1.496E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	52	Cr	72	ppb



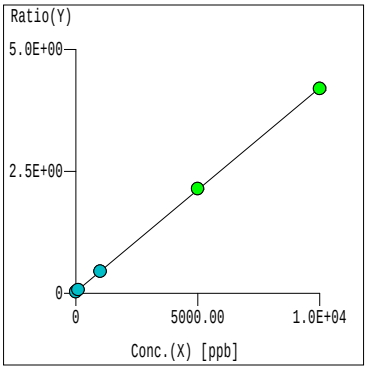
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.640E-002*X +8.682E-003
X = 6.096E+001*Y -5.292E-001
DL = 4.506E-02 ppb
BEC = 5.292E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	55	Mn	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.003E-002*X +3.024E-003
X = 4.992E+001*Y -1.510E-001
DL = 2.257E-02 ppb
BEC = 1.510E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	57	Fe	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.178E-004*X +3.256E-002
X = 2.393E+003*Y -7.792E+001
DL = 7.564E-01 ppb
BEC = 77.92 ppb

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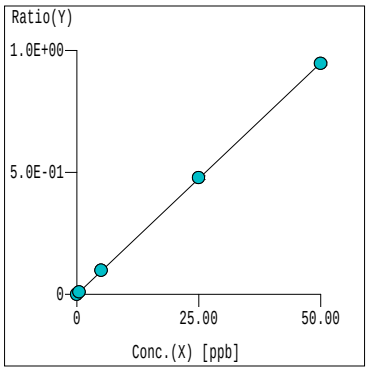
=== Graph Detail ===

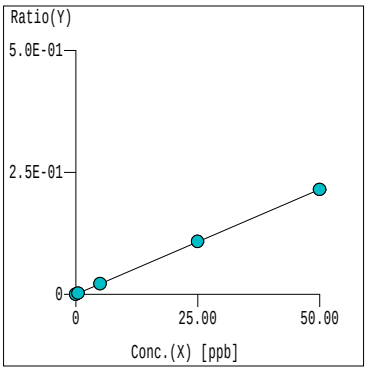
Cal. Date: 07/28/2014, 12:48

Step	Mass	Element	ISTD	Unit
(1)	59	Co	72	ppb



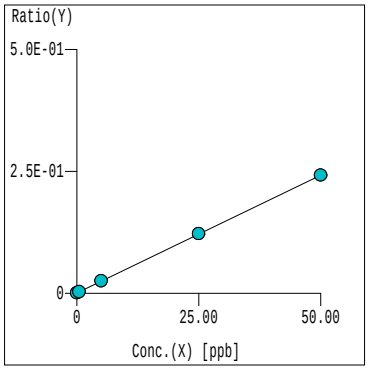
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.897E-002*X +2.491E-004
X = 5.271E+001*Y -1.313E-002
DL = 1.473E-02 ppb
BEC = 1.313E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	60	Ni	72	ppb



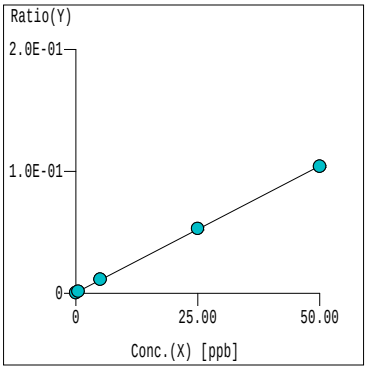
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.303E-003*X +9.823E-005
X = 2.324E+002*Y -2.283E-002
DL = 1.387E-02 ppb
BEC = 2.283E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	65	Cu	72	ppb



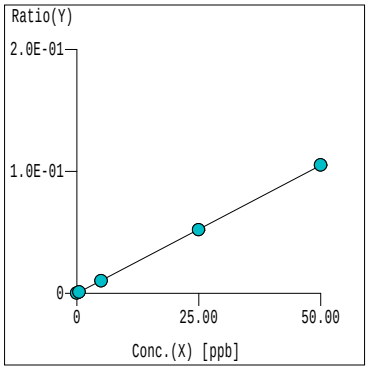
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.832E-003*X +1.035E-003
X = 2.069E+002*Y -2.141E-001
DL = 1.589E-02 ppb
BEC = 2.141E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	66	Zn	72	ppb



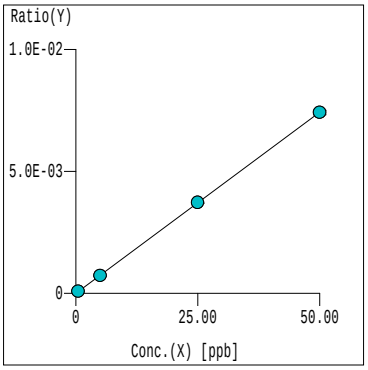
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.078E-003*X +6.137E-004
X = 4.812E+002*Y -2.953E-001
DL = 1.292E-01 ppb
BEC = 2.953E-01 ppb

Step	Mass	Element	ISTD	Unit
(1)	75	As	72	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.096E-003*X +1.578E-004
X = 4.771E+002*Y -7.528E-002
DL = 1.175E-01 ppb
BEC = 7.528E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	82	Se	72	ppb

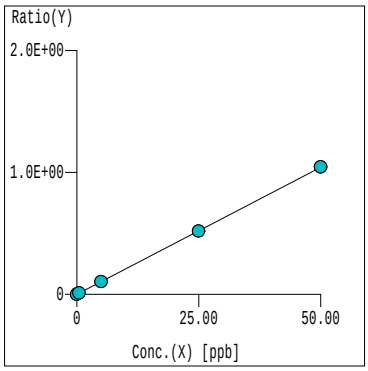


Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.485E-004*X -3.457E-006
X = 6.732E+003*Y +2.327E-002
DL = 2.996E-01 ppb
BEC = -2.327E-02 ppb

=== Graph Detail ===

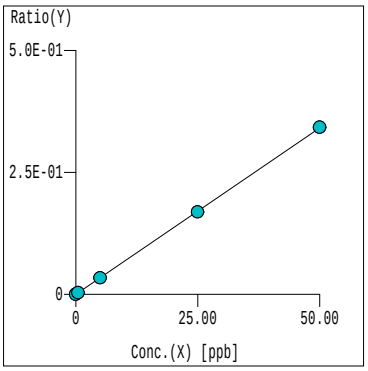
Cal. Date: 07/28/2014, 12:48

Step	Mass	Element	ISTD	Unit
(1)	88	Sr	72	ppb



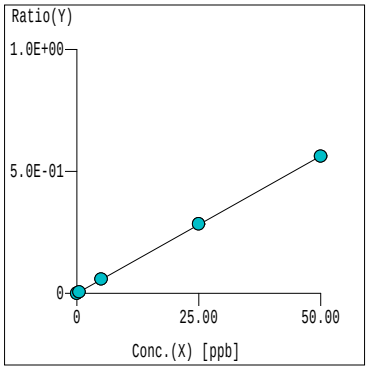
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 2.086E-002*X +1.776E-004
X = 4.794E+001*Y -8.515E-003
DL = 1.476E-02 ppb
BEC = 8.515E-03 ppb

Step	Mass	Element	ISTD	Unit
(1)	98	Mo	72	ppb



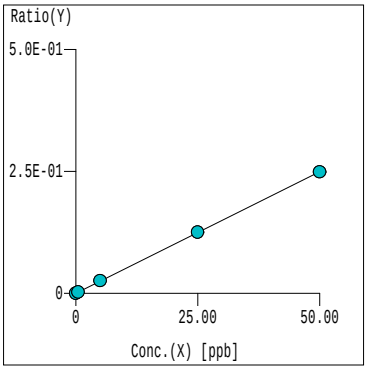
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 6.826E-003*X +8.933E-005
X = 1.465E+002*Y -1.309E-002
DL = 8.481E-03 ppb
BEC = 1.309E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	107	Ag	72	ppb



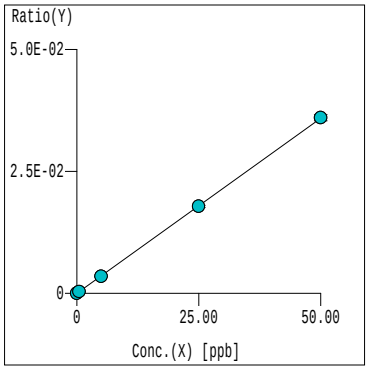
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.128E-002*X +7.291E-005
X = 8.867E+001*Y -6.465E-003
DL = 6.892E-03 ppb
BEC = 6.465E-03 ppb

Step	Mass	Element	ISTD	Unit
(1)	114	Cd	72	ppb



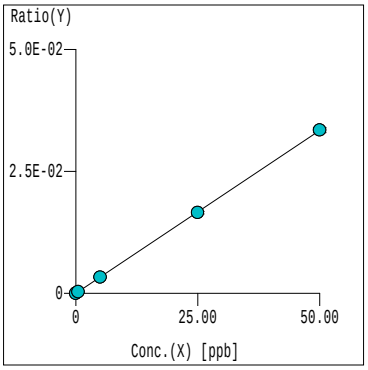
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.985E-003*X +1.334E-004
X = 2.006E+002*Y -2.675E-002
DL = 5.116E-03 ppb
BEC = 2.675E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	118	Sn	159	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 7.183E-004*X +1.295E-005
X = 1.392E+003*Y -1.802E-002
DL = 1.806E-02 ppb
BEC = 1.802E-02 ppb

Step	Mass	Element	ISTD	Unit
(1)	123	Sb	159	ppb

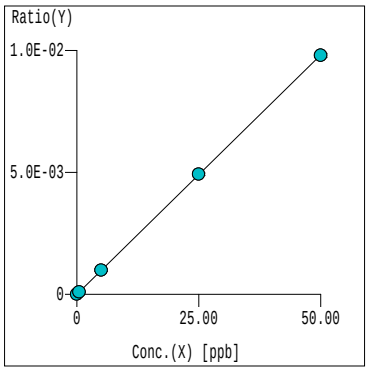


Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 6.681E-004*X +5.675E-006
X = 1.497E+003*Y -8.494E-003
DL = 3.817E-03 ppb
BEC = 8.494E-03 ppb

=== Graph Detail ===

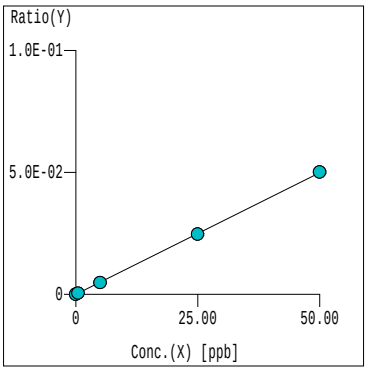
Cal. Date: 07/28/2014, 12:48

Step Mass Element	ISTD	Unit
(1) 135 Ba	159	ppb



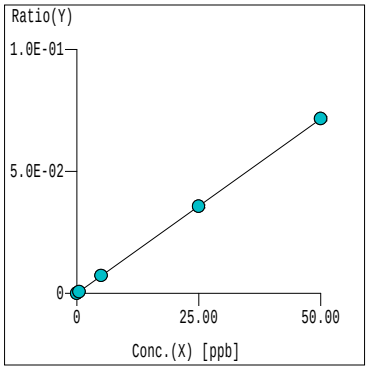
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.961E-004*X +5.088E-006
X = 5.099E+003*Y -2.594E-002
DL = 2.280E-02 ppb
BEC = 2.594E-02 ppb

Step Mass Element	ISTD	Unit
(1) 182 W	159	ppb



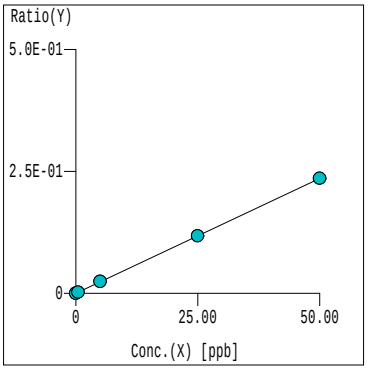
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 9.990E-004*X +1.199E-005
X = 1.001E+003*Y -1.200E-002
DL = 1.200E-02 ppb
BEC = 1.200E-02 ppb

Step Mass Element	ISTD	Unit
(1) 203 Tl	209	ppb



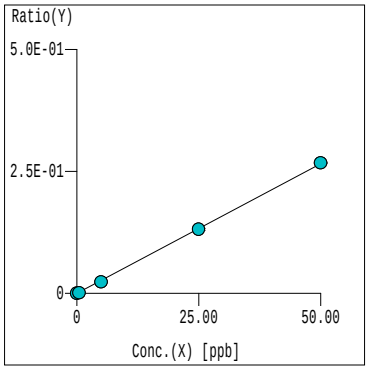
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 1.431E-003*X +5.770E-006
X = 6.986E+002*Y -4.031E-003
DL = 4.645E-03 ppb
BEC = 4.031E-03 ppb

Step Mass Element	ISTD	Unit
(1) 208 Pb	209	ppb



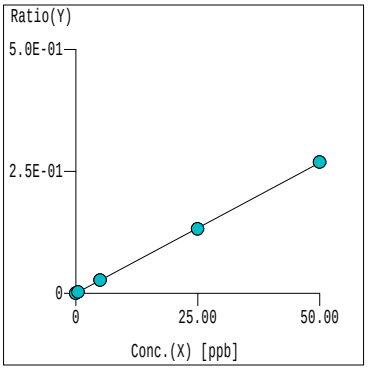
Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 4.715E-003*X +9.990E-005
X = 2.121E+002*Y -2.119E-002
DL = 9.129E-03 ppb
BEC = 2.119E-02 ppb

Step Mass Element	ISTD	Unit
(1) 232 Th	209	ppb



Curve Fit: Y=aX+[blank]
r = 0.9999
Y = 5.324E-003*X +1.083E-005
X = 1.878E+002*Y -2.034E-003
DL = 2.672E-03 ppb
BEC = 2.034E-03 ppb

Step Mass Element	ISTD	Unit
(1) 238 U	209	ppb



Curve Fit: Y=aX+[blank]
r = 1.0000
Y = 5.359E-003*X +5.087E-006
X = 1.866E+002*Y -9.492E-004
DL = 1.032E-03 ppb
BEC = 9.492E-04 ppb

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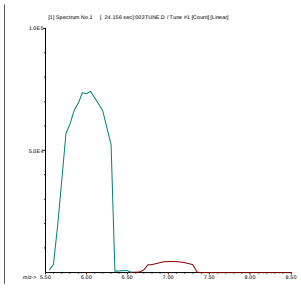
6020 QC Tune Report

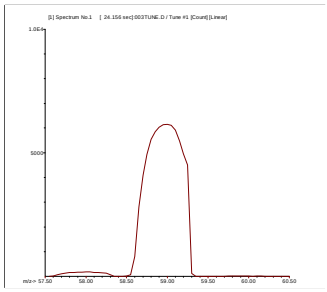
Data File: C:\ICPCHEM\1\DATA\JHG28A.B\003TUNE.D
Date Acquired: Jul 28 2014 12:03 pm
Acq. Method: TN6020E.M
Operator: EAM
Sample Name: 6020 TUNE
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020E.M

RSD (%)

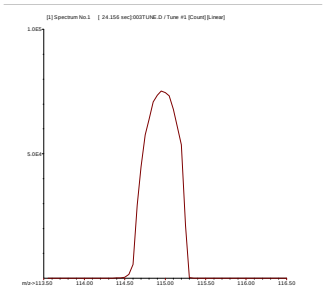
Element	Actual	Required	Flag
7 Li	1.01	5.00	
59 Co	0.56	5.00	
115 In	1.08	5.00	
205 Tl	1.21	5.00	



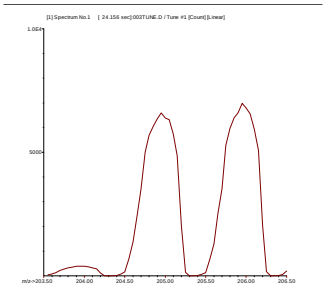
7 Li
Mass Calib.
Actual: 7.05
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 114.95
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



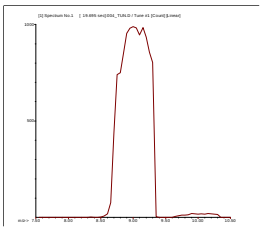
205 Tl
Mass Calib.
Actual: 204.95
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:

200.8 QC Tune Report

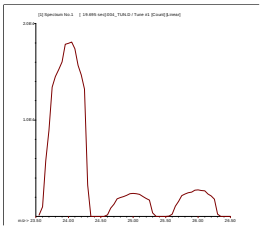
Data File: C:\ICPCHEM\1\DATA\JHG28A.B\004_TUN.D
Date Acquired: Jul 28 2014 12:05 pm
Acq. Method: TN200_8E.M
Operator: EAM
Sample Name: 200.8 TUNE
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8E.M

RSD (%)

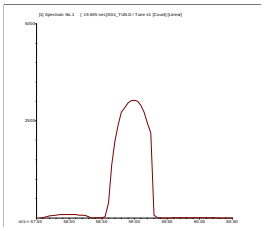
Element	Actual	Required	Flag
9 Be	2.27	5.00	
24 Mg	2.33	5.00	
59 Co	1.54	5.00	
115 In	1.49	5.00	
208 Pb	1.89	5.00	



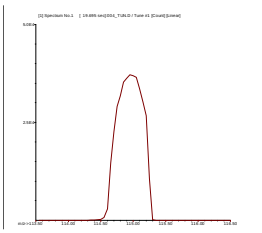
9 Be
Mass Calib.
Actual: 9.05
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



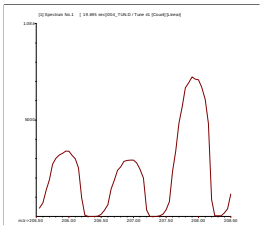
24 Mg
Mass Calib.
Actual: 24.00
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 114.95
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 207.95
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

Tune Result: Pass

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Calibration Blank QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.I
Date Acquired: Jul 28 2014 12:34 pm
Operator: EAM
Sample Name: Cal Blank
Misc Info:
Vial Number: 1203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 28 2014 12:33 pm
Sample Type: CalBlk
Total Dil Factor: 1.00

QC&ISTD Elements

Element		CPS Mean		SD	RSD(%)
6	Li	2737811.00	A	108300.00	3.96
9	Be	16.67	P	4.01	24.04
11	B	591.14	P	59.29	10.03
23	Na	55017.21	P	1273.00	2.31
25	Mg	246.69	P	56.97	23.09
27	Al	4124.15	P	403.30	9.78
28	Si	15756060.00	A	73210.00	0.46
29	Si	2195982.00	A	26970.00	1.23
39	K	1732896.00	A	7381.00	0.43
43	Ca	218.55	P	23.13	10.58
44	Ca	17008.51	P	196.20	1.15
45	Sc	2016878.00	A	46840.00	2.32
51	V	1169.67	P	530.30	45.34
52	Cr	3781.72	P	71.92	1.90
53	Cr	7760.02	P	319.40	4.12
55	Mn	3097.09	P	36.05	1.16
56	Fe	710701.63	P	8922.00	1.26
57	Fe	26445.14	P	1399.00	5.29
59	Co	275.58	P	13.88	5.04
60	Ni	180.51	P	22.70	12.58
63	Cu	565.59	P	53.16	9.40
65	Cu	225.56	P	29.88	13.25
66	Zn	372.24	P	40.74	10.95
68	Zn	5185.57	P	172.40	3.32
72	Ge	420175.91	P	14000.00	3.33
75	As	-85.60	P	74.81	87.39
82	Se	-19.70	P	9.02	45.80
88	Sr	174.10	P	42.07	24.17
89	Y	3027289.00	A	95670.00	3.16
98	Mo	62.96	P	35.55	56.46
107	Ag	45.56	P	18.95	41.60
109	Ag	28.89	P	10.71	37.07
111	Cd	1131.56	P	41.20	3.64
114	Cd	49.84	P	12.77	25.62
115	In	2763301.00	A	95500.00	3.46
118	Sn	74.45	P	13.47	18.09
120	Sn	90.00	P	8.82	9.80
121	Sb	50.00	P	5.77	11.55
123	Sb	43.33	P	3.33	7.69
135	Ba	31.11	P	5.09	16.37
137	Ba	42.22	P	6.94	16.43
159	Tb	3819393.00	A	125400.00	3.28
182	W	63.34	P	35.28	55.70
203	Tl	32.22	P	10.18	31.59
205	Tl	51.11	P	10.71	20.95
208	Pb	303.35	P	37.57	12.39
209	Bi	2381091.00	A	58360.00	2.45
232	Th	134.45	P	24.57	18.27
238	U	31.11	P	12.62	40.56

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\014CALI.D\014CALI.D#
Date Acquired: Jul 28 2014 12:37 pm
Operator: EAM
Sample Name: Cal Std 1
Misc Info:
Vial Number: 1101
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 28 2014 12:36 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	2704398.00	A	15930.00	0.59
9 Be	1160.06	P	82.29	7.09
11 B	1078.96	P	35.64	3.30
23 Na	722138.13	P	12100.00	1.68
25 Mg	58754.26	P	460.80	0.78
27 Al	59701.16	P	1314.00	2.20
28 Si	15628620.00	A	145600.00	0.93
29 Si	2178690.00	A	5058.00	0.23
39 K	2271242.00	A	7656.00	0.34
43 Ca	1196.49	P	44.92	3.75
44 Ca	32895.78	P	340.20	1.03
45 Sc	1989426.00	A	26470.00	1.33
51 V	5542.86	P	311.20	5.61
52 Cr	7129.67	P	156.80	2.20
53 Cr	7534.36	P	133.70	1.77
55 Mn	7291.98	P	118.40	1.62
56 Fe	1486257.00	A	14640.00	0.99
57 Fe	42951.62	P	690.30	1.61
59 Co	3920.78	P	96.18	2.45
60 Ni	955.70	P	15.07	1.58
63 Cu	2551.42	P	193.40	7.58
65 Cu	1151.60	P	39.07	3.39
66 Zn	1010.07	P	50.34	4.98
68 Zn	5667.96	P	318.70	5.62
72 Ge	414361.59	P	6104.00	1.47
75 As	299.23	P	129.30	43.21
82 Se	19.08	P	8.07	42.28
88 Sr	4530.82	P	63.18	1.39
89 Y	2972434.00	A	29750.00	1.00
98 Mo	1367.49	P	40.48	2.96
107 Ag	2231.36	P	5.09	0.23
109 Ag	2122.45	P	51.70	2.44
111 Cd	1538.46	P	19.95	1.30
114 Cd	1049.65	P	31.13	2.97
115 In	2705445.00	A	48960.00	1.81
118 Sn	1297.88	P	3.85	0.30
120 Sn	1834.63	P	141.50	7.71
121 Sb	1795.73	P	117.80	6.56
123 Sb	1319.00	P	49.15	3.73
135 Ba	427.80	P	5.09	1.19
137 Ba	740.05	P	30.00	4.05
159 Tb	3792552.00	A	47940.00	1.26
182 W	1912.42	P	73.14	3.82
203 Tl	1549.03	P	60.13	3.88
205 Tl	3639.51	P	80.62	2.22
208 Pb	5463.95	P	179.50	3.29
209 Bi	2361692.00	A	32050.00	1.36
232 Th	2142.48	P	333.80	15.58
238 U	5585.83	P	186.30	3.34

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2704397.80	0.59	2737811.30	98.8	79.5 - 120.4	
45 Sc	1989425.60	1.33	2016878.10	98.6	79.5 - 120.4	
72 Ge	414361.63	1.47	420175.84	98.6	79.5 - 120.4	
159 Tb	3792552.00	1.26	3819393.30	99.3	79.5 - 120.4	
209 Bi	2361691.80	1.36	2381090.80	99.2	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000182

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\015CALI.D\015CALI.D#
Date Acquired: Jul 28 2014 12:40 pm
Operator: EAM
Sample Name: Cal Std 2
Misc Info:
Vial Number: 1102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 28 2014 12:39 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	2712779.00	A	76190.00	2.81
9 Be	12251.19	P	199.30	1.63
11 B	6213.66	P	210.90	3.39
23 Na	6570048.00	A	157200.00	2.39
25 Mg	575730.13	P	9994.00	1.74
27 Al	554987.38	P	19910.00	3.59
28 Si	15814520.00	A	108000.00	0.68
29 Si	2187576.00	A	23360.00	1.07
39 K	7215557.00	A	76710.00	1.06
43 Ca	10319.56	P	212.80	2.06
44 Ca	180165.41	P	3148.00	1.75
45 Sc	1989878.00	A	47960.00	2.41
51 V	38559.79	P	1257.00	3.26
52 Cr	36669.42	P	480.30	1.31
53 Cr	11417.95	P	102.80	0.90
55 Mn	43614.71	P	1606.00	3.68
56 Fe	7268707.00	A	76800.00	1.06
57 Fe	190060.20	P	3287.00	1.73
59 Co	37125.31	P	607.90	1.64
60 Ni	8511.91	P	155.50	1.83
63 Cu	20562.42	P	405.70	1.97
65 Cu	9608.71	P	82.97	0.86
66 Zn	4984.34	P	150.20	3.01
68 Zn	8380.42	P	55.53	0.66
72 Ge	415266.50	P	10320.00	2.49
75 As	4779.13	P	86.34	1.81
82 Se	278.34	P	27.89	10.02
88 Sr	43267.60	P	1025.00	2.37
89 Y	2974057.00	A	35780.00	1.20
98 Mo	13634.25	P	99.10	0.73
107 Ag	23098.82	P	510.70	2.21
109 Ag	21892.61	P	492.60	2.25
111 Cd	5680.57	P	105.40	1.86
114 Cd	10500.54	P	173.00	1.65
115 In	2729874.00	A	60300.00	2.21
118 Sn	12781.59	P	219.40	1.72
120 Sn	17758.07	P	537.50	3.03
121 Sb	17832.59	P	386.00	2.16
123 Sb	13851.47	P	179.50	1.30
135 Ba	4050.72	P	193.30	4.77
137 Ba	6936.36	P	315.20	4.54
159 Tb	3737699.00	A	78150.00	2.09
182 W	17633.94	P	208.80	1.18
203 Tl	16057.63	P	578.50	3.60
205 Tl	38855.80	P	897.00	2.31
208 Pb	52615.69	P	1133.00	2.15
209 Bi	2346744.00	A	45210.00	1.93
232 Th	47143.80	P	3758.00	7.97
238 U	57381.41	P	1283.00	2.24

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2712779.00	2.81	2737811.30	99.1	79.5 - 120.4	
45 Sc	1989878.10	2.41	2016878.10	98.7	79.5 - 120.4	
72 Ge	415266.50	2.49	420175.84	98.8	79.5 - 120.4	
159 Tb	3737698.80	2.09	3819393.30	97.9	79.5 - 120.4	
209 Bi	2346744.00	1.93	2381090.80	98.6	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000183

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\016CALI.D\016CALI.D#
Date Acquired: Jul 28 2014 12:43 pm
Operator: EAM
Sample Name: Cal Std 3
Misc Info:
Vial Number: 1103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 28 2014 12:42 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	2680756.00	A	102500.00	3.82
9 Be	59188.77	P	151.60	0.26
11 B	28291.92	P	272.30	0.96
23 Na	32270110.00	A	862200.00	2.67
25 Mg	2852190.00	A	26340.00	0.92
27 Al	2753638.00	A	29880.00	1.09
28 Si	16996580.00	A	163100.00	0.96
29 Si	2226472.00	A	8338.00	0.37
39 K	29059600.00	A	254300.00	0.88
43 Ca	51131.37	P	891.90	1.74
44 Ca	825542.19	P	8251.00	1.00
45 Sc	1980240.00	A	10750.00	0.54
51 V	185492.59	P	444.30	0.24
52 Cr	164008.30	P	1595.00	0.97
53 Cr	26881.10	P	516.00	1.92
55 Mn	201456.09	P	255.50	0.13
56 Fe	33087640.00	A	185100.00	0.56
57 Fe	837713.00	P	8602.00	1.03
59 Co	181371.09	P	1267.00	0.70
60 Ni	40339.49	P	661.70	1.64
63 Cu	98086.02	P	731.90	0.75
65 Cu	45725.03	P	742.80	1.62
66 Zn	22708.83	P	104.20	0.46
68 Zn	20916.25	P	572.00	2.73
72 Ge	411143.91	P	4993.00	1.21
75 As	23440.23	P	204.80	0.87
82 Se	1374.81	P	11.95	0.87
88 Sr	214208.59	P	917.90	0.43
89 Y	2947323.00	A	17520.00	0.59
98 Mo	67518.03	P	588.00	0.87
107 Ag	110837.20	P	1365.00	1.23
109 Ag	106898.00	P	660.90	0.62
111 Cd	22986.18	P	325.80	1.42
114 Cd	50748.96	P	49.93	0.10
115 In	2691826.00	A	17970.00	0.67
118 Sn	64236.92	P	506.20	0.79
120 Sn	88452.37	P	862.90	0.98
121 Sb	88432.41	P	63.78	0.07
123 Sb	66930.75	P	713.20	1.07
135 Ba	18969.74	P	243.80	1.29
137 Ba	33008.74	P	491.90	1.49
159 Tb	3723710.00	A	33830.00	0.91
182 W	87331.43	P	757.50	0.87
203 Tl	77775.89	P	582.70	0.75
205 Tl	187960.80	P	1444.00	0.77
208 Pb	255979.09	P	2025.00	0.79
209 Bi	2312400.00	A	16100.00	0.70
232 Th	285537.69	P	1336.00	0.47
238 U	283398.41	P	3111.00	1.10

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2680755.50	3.82	2737811.30	97.9	79.5 - 120.4	
45 Sc	1980239.80	0.54	2016878.10	98.2	79.5 - 120.4	
72 Ge	411143.88	1.21	420175.84	97.9	79.5 - 120.4	
159 Tb	3723709.50	0.91	3819393.30	97.5	79.5 - 120.4	
209 Bi	2312399.50	0.70	2381090.80	97.1	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000184

Calibration Standard QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\017CALI.D\017CALI.D#
Date Acquired: Jul 28 2014 12:46 pm
Operator: EAM
Sample Name: Cal Std 4
Misc Info:
Vial Number: 1104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal Update: Jul 28 2014 12:45 pm
Sample Type: CalStd
Total Dil Factor: 1.00

QC&ISTD Elements

Element	CPS Mean		SD	RSD(%)
6 Li	2647930.00	A	25230.00	0.95
9 Be	119999.30	P	854.00	0.71
11 B	56398.31	P	1244.00	2.21
23 Na	64220420.00	A	320500.00	0.50
25 Mg	5583105.00	A	69780.00	1.25
27 Al	5431229.00	A	46700.00	0.86
28 Si	18779200.00	A	218100.00	1.16
29 Si	2305922.00	A	8752.00	0.38
39 K	57114860.00	A	372000.00	0.65
43 Ca	102556.80	P	179.80	0.18
44 Ca	1690040.00	A	984.80	0.06
45 Sc	1996098.00	A	12990.00	0.65
51 V	373889.31	P	1298.00	0.35
52 Cr	325484.00	P	1121.00	0.34
53 Cr	45855.34	P	505.50	1.10
55 Mn	400404.59	P	2183.00	0.55
56 Fe	66079160.00	A	143100.00	0.22
57 Fe	1693592.00	A	8720.00	0.51
59 Co	359959.59	P	1003.00	0.28
60 Ni	80561.62	P	853.40	1.06
63 Cu	194439.00	P	340.80	0.18
65 Cu	90111.17	P	1299.00	1.44
66 Zn	44843.10	P	240.70	0.54
68 Zn	36261.25	P	289.40	0.80
72 Ge	410378.00	P	3872.00	0.94
75 As	47173.29	P	540.10	1.14
82 Se	2726.64	P	33.69	1.24
88 Sr	430944.81	P	5342.00	1.24
89 Y	2925851.00	A	47780.00	1.63
98 Mo	137513.00	P	884.30	0.64
107 Ag	221985.09	P	855.80	0.39
109 Ag	213042.41	P	2733.00	1.28
111 Cd	44724.66	P	234.30	0.52
114 Cd	101800.60	P	496.00	0.49
115 In	2659017.00	A	25200.00	0.95
118 Sn	129435.20	P	1427.00	1.10
120 Sn	179347.20	P	2080.00	1.16
121 Sb	179186.50	P	1147.00	0.64
123 Sb	135691.50	P	907.80	0.67
135 Ba	38588.10	P	162.20	0.42
137 Ba	66542.47	P	772.20	1.16
159 Tb	3721719.00	A	40250.00	1.08
182 W	177735.09	P	1964.00	1.11
203 Tl	153534.59	P	1378.00	0.90
205 Tl	375129.31	P	4419.00	1.18
208 Pb	510997.50	P	5298.00	1.04
209 Bi	2276138.00	A	31560.00	1.39
232 Th	580372.00	P	6176.00	1.06
238 U	569607.63	P	7107.00	1.25

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2647929.80	0.95	2737811.30	96.7	79.5 - 120.4	
45 Sc	1996097.60	0.65	2016878.10	99.0	79.5 - 120.4	
72 Ge	410378.00	0.94	420175.84	97.7	79.5 - 120.4	
159 Tb	3721719.00	1.08	3819393.30	97.4	79.5 - 120.4	
209 Bi	2276138.00	1.39	2381090.80	95.6	79.5 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

--- :Element Failures --- :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000185

ICV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\018_ICV.D\018_ICV.D#
Date Acquired: Jul 28 2014 12:49 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICV
Misc Info:
Vial Number: 1202
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.499998 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	19.46	ppb	0.36	20	97.3	
11 B	21.03	ppb	1.98	20	105.15	
23 Na	3,950.	ppb	1.22	4,000	98.75	
25 Mg	4,086.	ppb	1.44	4,000	102.15	
27 Al	400.3	ppb	0.74	400	100.075	
28 Si	274.7	ppb	22.64	400	68.675	
29 Si	104.7	ppb	253.96	400	26.175	Fail
39 K	3,977.	ppb	0.43	4,000	99.425	
43 Ca	3,991.	ppb	1.16	4,000	99.775	
44 Ca	3,890.	ppb	0.45	4,000	97.25	
51 V	19.85	ppb	1.24	20	99.25	
52 Cr	19.26	ppb	1.22	20	96.3	
53 Cr	18.35	ppb	2.13	20	91.75	
55 Mn	19.87	ppb	0.87	20	99.35	
56 Fe	4,016.	ppb	0.43	4,000	100.4	
57 Fe	3,944.	ppb	0.20	4,000	98.6	
59 Co	20.27	ppb	0.32	20	101.35	
60 Ni	20.61	ppb	0.43	20	103.05	
63 Cu	19.72	ppb	0.53	20	98.6	
65 Cu	20.22	ppb	0.81	20	101.1	
66 Zn	20.16	ppb	0.37	20	100.8	
68 Zn	20.58	ppb	0.49	20	102.9	
75 As	20.13	ppb	0.24	20	100.65	
82 Se	20.16	ppb	1.71	20	100.8	
88 Sr	20.44	ppb	1.24	20	102.2	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	41.33	ppb	1.20	40	103.325	
107 Ag	20.22	ppb	0.58	20	101.1	
109 Ag	19.97	ppb	0.91	20	99.85	
111 Cd	19.61	ppb	0.10	20	98.05	
114 Cd	19.74	ppb	0.63	20	98.7	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	20.15	ppb	0.46	20	100.75	
120 Sn	20.2	ppb	0.90	20	101	
121 Sb	19.74	ppb	1.08	20	98.7	
123 Sb	19.96	ppb	1.80	20	99.8	
135 Ba	19.7	ppb	2.71	20	98.5	
137 Ba	19.84	ppb	0.73	20	99.2	
182 W	19.15	ppb	1.27	20	95.75	
203 Tl	20.5	ppb	1.99	20	102.5	
205 Tl	20.53	ppb	0.84	20	102.65	
208 Pb	20.06	ppb	1.08	20	100.3	
232 Th	20.28	ppb	2.20	20	101.4	
238 U	20.1	ppb	1.38	20	100.5	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2698401.80	1.26	2737811.30	98.6	80 - 120.4	
45 Sc	2011745.40	1.17	2016878.10	99.7	80 - 120.4	
72 Ge	413314.81	1.05	420175.84	98.4	80 - 120.4	
159 Tb	3718900.30	0.63	3819393.30	97.4	80 - 120.4	
209 Bi	2305070.50	0.50	2381090.80	96.8	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000186

ICB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\019_ICB.D\019_ICB.D#
Date Acquired: Jul 28 2014 12:53 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICB
Misc Info:
Vial Number: 1203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-ICB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0048	ppb	47.25	1.00	
11 B	0.5918	ppb	22.07	1.00	
23 Na	0.4988	ppb	36.51	1.00	
25 Mg	0.4401	ppb	30.02	1.00	
27 Al	0.0214	ppb	334.75	1.00	
28 Si	-96.4	ppb	12.70	1.00	
29 Si	-316.3	ppb	36.74	1.00	Fail
39 K	-2.924	ppb	23.76	1.00	
43 Ca	-2.54	ppb	136.14	1.00	
44 Ca	-4.203	ppb	24.34	1.00	
51 V	0.078	ppb	120.57	1.00	
52 Cr	0.0068	ppb	231.06	1.00	
53 Cr	-0.4921	ppb	54.56	1.00	
55 Mn	-0.0083	ppb	89.64	1.00	
56 Fe	0.2414	ppb	279.04	1.00	
57 Fe	2.212	ppb	323.10	1.00	
59 Co	0.0027	ppb	127.66	1.00	
60 Ni	-0.0094	ppb	89.92	1.00	
63 Cu	-0.0097	ppb	132.41	1.00	
65 Cu	0.0045	ppb	345.90	1.00	
66 Zn	0.0211	ppb	116.73	1.00	
68 Zn	0.5391	ppb	83.68	1.00	
75 As	-0.0266	ppb	172.36	1.00	
82 Se	0.253	ppb	38.24	1.00	
88 Sr	-0.0034	ppb	141.04	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.1456	ppb	6.67	1.00	
107 Ag	0.0041	ppb	46.99	1.00	
109 Ag	0.0049	ppb	40.63	1.00	
111 Cd	-0.0364	ppb	15.90	1.00	
114 Cd	0.0031	ppb	128.81	1.00	
115 In	--------	---	--------	---	
118 Sn	0.1043	ppb	23.31	1.00	
120 Sn	0.0913	ppb	15.31	1.00	
121 Sb	0.0169	ppb	30.71	1.00	
123 Sb	0.019	ppb	33.40	1.00	
135 Ba	-0.0038	ppb	246.56	1.00	
137 Ba	0.0038	ppb	238.00	1.00	
182 W	0.1598	ppb	13.17	1.00	
203 Tl	0.0239	ppb	12.83	1.00	
205 Tl	0.0165	ppb	22.75	1.00	
208 Pb	-0.0012	ppb	474.59	1.00	
232 Th	0.0575	ppb	26.99	1.00	
238 U	0.0048	ppb	21.81	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2755078.80	1.42	2737811.30	100.6	79.5 - 120	
45 Sc	2019366.30	1.54	2016878.10	100.1	79.5 - 120	
72 Ge	420539.22	1.55	420175.84	100.1	79.5 - 120	
159 Tb	3759103.30	1.90	3819393.30	98.4	79.5 - 120	
209 Bi	2360614.50	1.46	2381090.80	99.1	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000187

PQL QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\020_PQL.D\020_PQL.D#
Date Acquired: Jul 28 2014 12:56 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PQL
Misc Info:
Vial Number: 1302
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 69.599998 - 130.4

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	0.193	ppb	6.75	0.20	96.5	
11 B	5.311	ppb	1.30	4.00	132.775	Fail
23 Na	212.1	ppb	2.20	200.00	106.05	
25 Mg	20.68	ppb	3.81	20.00	103.4	
27 Al	61.57	ppb	1.67	60.00	102.617	
28 Si	110.	ppb	64.05	100.00	110	
29 Si	38.38	ppb	310.84	100.00	38.38	Fail
39 K	204.	ppb	3.62	200.00	102	
43 Ca	28.8	ppb	6.46	20.00	144	
44 Ca	24.09	ppb	17.67	20.00	120.45	Fail-DoD
51 V	1.136	ppb	5.32	1.00	113.6	
52 Cr	0.9685	ppb	3.94	1.00	96.85	
53 Cr	0.3816	ppb	84.33	---	#VALUE!	
55 Mn	0.4121	ppb	1.88	0.40	103.025	
56 Fe	21.2	ppb	5.21	20.00	106	
57 Fe	22.4	ppb	20.74	20.00	112	
59 Co	0.2163	ppb	5.78	0.20	108.15	
60 Ni	0.3902	ppb	5.40	0.40	97.55	
63 Cu	0.5987	ppb	2.35	0.60	99.7833	
65 Cu	0.6088	ppb	2.74	0.60	101.467	
66 Zn	2.058	ppb	0.92	2.00	102.9	
68 Zn	2.542	ppb	6.84	2.00	127.1	
75 As	1.18	ppb	4.93	1.00	118	
82 Se	0.8882	ppb	24.07	1.00	88.82	
88 Sr	0.9834	ppb	2.77	1.00	98.34	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	1.043	ppb	3.04	1.00	104.3	
107 Ag	0.2111	ppb	6.80	0.20	105.55	
109 Ag	0.2174	ppb	3.94	0.20	108.7	
111 Cd	0.1902	ppb	48.75	0.20	95.1	
114 Cd	0.2069	ppb	8.08	0.20	103.45	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	1.015	ppb	7.54	1.00	101.5	
120 Sn	0.9932	ppb	2.01	1.00	99.32	
121 Sb	0.209	ppb	6.43	0.20	104.5	
123 Sb	0.208	ppb	14.14	0.20	104	
135 Ba	0.447	ppb	23.65	0.40	111.75	
137 Ba	0.4008	ppb	10.35	0.40	100.2	
182 W	1.089	ppb	4.16	1.00	108.9	
203 Tl	0.2007	ppb	7.35	0.20	100.35	
205 Tl	0.2073	ppb	1.30	0.20	103.65	
208 Pb	0.2009	ppb	4.09	0.20	100.45	
232 Th	0.2021	ppb	5.85	0.20	101.05	
238 U	0.2046	ppb	2.72	0.20	102.3	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2697685.80	1.07	2737811.30	98.5	80 - 120.4	
45 Sc	1979632.60	1.38	2016878.10	98.2	80 - 120.4	
72 Ge	409875.38	0.52	420175.84	97.5	80 - 120.4	
159 Tb	3700324.50	0.91	3819393.30	96.9	80 - 120.4	
209 Bi	2316237.50	0.97	2381090.80	97.3	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000188

ICS-A QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\021ICSA.D\021ICSA.D#
Date Acquired: Jul 28 2014 12:59 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICSA
Misc Info:
Vial Number: 1204
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-ICSA
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0143	ppb	18.86		
11 B	1.804	ppb	8.08		
23 Na	94,560.	ppb	1.70		
25 Mg	92,540.	ppb	1.50		
27 Al	92,410.	ppb	1.26		
28 Si	123.6	ppb	69.10		
29 Si	-723.2	ppb	19.25		Fail
39 K	94,910.	ppb	1.34		
43 Ca	97,510.	ppb	1.86		
44 Ca	91,650.	ppb	1.17		
51 V	0.2253	ppb	50.73		
52 Cr	1.67	ppb	3.27		
53 Cr	0.7192	ppb	47.37		
55 Mn	0.35	ppb	4.11		
56 Fe	90,840.	ppb	1.26		
57 Fe	86,980.	ppb	0.99		
59 Co	0.1386	ppb	5.29		
60 Ni	0.1277	ppb	6.81		
63 Cu	1.461	ppb	2.58		
65 Cu	1.087	ppb	3.79		
66 Zn	1.994	ppb	4.71		
68 Zn	0.927	ppb	27.53		
75 As	0.4814	ppb	20.30		
82 Se	0.1204	ppb	48.70		
88 Sr	0.599	ppb	2.84		
89 Y	--------	---	--------		
98 Mo	1,830.	ppb	1.30		
107 Ag	0.0183	ppb	38.79		
109 Ag	0.0258	ppb	27.07		
111 Cd	-0.0339	ppb	32.34		
114 Cd	0.4592	ppb	5.80		Fail-D
115 In	--------	---	--------		
118 Sn	0.0627	ppb	9.35		
120 Sn	0.0627	ppb	11.70		
121 Sb	0.0416	ppb	18.42		
123 Sb	0.0487	ppb	11.92		
135 Ba	0.1596	ppb	2.25		
137 Ba	0.0886	ppb	30.72		
182 W	0.1807	ppb	4.11		
203 Tl	0.0078	ppb	27.53		
205 Tl	0.0096	ppb	24.90		
208 Pb	0.2167	ppb	5.25		
232 Th	0.2668	ppb	37.48		
238 U	0.0023	ppb	57.43		

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2498885.80	1.69	2737811.30	91.3	69.5 - 130.4	
45 Sc	1908931.60	1.11	2016878.10	94.6	69.5 - 130.4	
72 Ge	409523.22	0.99	420175.84	97.5	69.5 - 130.4	
159 Tb	3564753.80	0.47	3819393.30	93.3	69.5 - 130.4	
209 Bi	2090843.50	0.71	2381090.80	87.8	69.5 - 130.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000189

ICS-AB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\022ICSB.D\022ICSB.D#
Date Acquired: Jul 28 2014 01:02 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: ICSAB
Misc Info:
Vial Number: 1205
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-ICSAB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	Expected	QC Range(%)	Flag
9 Be	19.69	ppb	0.65	20.00	79.5 - 120	
11 B	20.42	ppb	2.29	20.00	79.5 - 120	
23 Na	93,270.	ppb	0.90	#########	79.5 - 120	
25 Mg	91,970.	ppb	1.00	#########	79.5 - 120	
27 Al	91,860.	ppb	0.48	#########	79.5 - 120	
28 Si	552.4	ppb	12.93	---	##### - #####	
29 Si	-523.	ppb	22.75	---	##### - #####	
39 K	94,040.	ppb	0.80	#########	79.5 - 120	
43 Ca	96,690.	ppb	0.77	#########	79.5 - 120	
44 Ca	90,710.	ppb	0.28	#########	79.5 - 120	
51 V	19.28	ppb	1.70	20.00	79.5 - 120	
52 Cr	20.26	ppb	1.21	20.00	79.5 - 120	
53 Cr	19.45	ppb	2.02	---	##### - #####	
55 Mn	18.66	ppb	1.13	20.00	79.5 - 120	
56 Fe	89,770.	ppb	1.22	#########	79.5 - 120	
57 Fe	85,340.	ppb	1.52	#########	79.5 - 120	
59 Co	18.73	ppb	1.06	20.00	79.5 - 120	
60 Ni	18.49	ppb	2.00	20.00	79.5 - 120	
63 Cu	19.41	ppb	1.34	20.00	79.5 - 120	
65 Cu	19.3	ppb	1.07	20.00	79.5 - 120	
66 Zn	20.15	ppb	1.69	20.00	79.5 - 120	
68 Zn	18.18	ppb	0.74	20.00	79.5 - 120	
75 As	19.5	ppb	1.57	20.00	79.5 - 120	
82 Se	19.97	ppb	2.31	20.00	79.5 - 120	
88 Sr	18.71	ppb	2.35	20.00	79.5 - 120	
89 Y	--------	---	--------	---	##### - #####	
98 Mo	1,862.	ppb	1.99	2000.00	79.5 - 120	
107 Ag	17.93	ppb	1.52	20.00	79.5 - 120	
109 Ag	18.	ppb	2.37	20.00	79.5 - 120	
111 Cd	18.37	ppb	2.04	20.00	79.5 - 120	
114 Cd	18.98	ppb	1.39	20.00	79.5 - 120	
115 In	--------	---	--------	---	##### - #####	
118 Sn	18.72	ppb	2.36	20.00	79.5 - 120	
120 Sn	18.58	ppb	0.16	20.00	79.5 - 120	
121 Sb	19.42	ppb	0.97	20.00	79.5 - 120	
123 Sb	19.4	ppb	1.12	20.00	79.5 - 120	
135 Ba	19.55	ppb	1.40	20.00	79.5 - 120	
137 Ba	19.38	ppb	2.36	20.00	79.5 - 120	
182 W	20.03	ppb	0.83	20.00	79.5 - 120	
203 Tl	20.16	ppb	0.19	20.00	79.5 - 120	
205 Tl	20.12	ppb	0.87	20.00	79.5 - 120	
208 Pb	20.28	ppb	0.92	20.00	79.5 - 120	
232 Th	21.09	ppb	1.26	20.00	79.5 - 120	
238 U	20.87	ppb	0.98	20.00	79.5 - 120	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2486538.50	1.30	2737811.30	90.8	69.5 - 130	
45 Sc	1928779.50	0.62	2016878.10	95.6	69.5 - 130	
72 Ge	416592.06	1.36	420175.84	99.1	69.5 - 130	
159 Tb	3705948.80	0.92	3819393.30	97.0	69.5 - 130	
209 Bi	2166561.30	0.53	2381090.80	91.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000190

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\023SMPL.D\023SMPL.D#
Date Acquired: Jul 28 2014 01:06 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: Blank
Misc Info:
Vial Number: 1301
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0028	0.0028	ppb	94.50	100.	
11 B	0.273	0.273	ppb	31.03	1000.	
23 Na	17.	17.	ppb	22.64	200000.	
25 Mg	6.606	6.606	ppb	48.06	200000.	
27 Al	5.301	5.301	ppb	63.95	200000.	
28 Si	84.18	84.18	ppb	142.20	#VALUE!	
29 Si	-1,042.	-1,042.	ppb	37.32	10000.	LOW
39 K	-17.87	-17.87	ppb	10.95	200000.	
43 Ca	4.832	4.832	ppb	67.01	#VALUE!	
44 Ca	6.968	6.968	ppb	70.06	200000.	
51 V	0.0513	0.0513	ppb	177.50	1000.	
52 Cr	-0.0084	-0.0084	ppb	39.86	1000.	
53 Cr	-0.846	-0.846	ppb	57.31	#VALUE!	
55 Mn	-0.0532	-0.0532	ppb	33.28	1000.	
56 Fe	4.757	4.757	ppb	59.49	#VALUE!	
57 Fe	-13.37	-13.37	ppb	25.51	100000.	
59 Co	0.0013	0.0013	ppb	327.57	1000.	
60 Ni	-0.0139	-0.0139	ppb	29.90	1000.	
63 Cu	0.1197	0.1197	ppb	20.23	#VALUE!	
65 Cu	0.1144	0.1144	ppb	11.96	1000.	
66 Zn	0.0292	0.0292	ppb	80.97	1000.	
68 Zn	-1.056	-1.056	ppb	16.14	#VALUE!	
75 As	0.1153	0.1153	ppb	71.10	1000.	
82 Se	0.5395	0.5395	ppb	13.98	1000.	
88 Sr	-0.0004	-0.0004	ppb	1243.70	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.796	1.796	ppb	18.09	1000.	
107 Ag	0.0014	0.0014	ppb	24.86	500.	
109 Ag	0.0026	0.0026	ppb	101.45	#VALUE!	
111 Cd	-0.1853	-0.1853	ppb	15.02	#VALUE!	
114 Cd	0.0098	0.0098	ppb	57.02	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.01	0.01	ppb	22.63	1000.	
120 Sn	0.0195	0.0195	ppb	20.04	#VALUE!	
121 Sb	0.0057	0.0057	ppb	85.69	#VALUE!	
123 Sb	-0.0005	-0.0005	ppb	421.75	1000.	
135 Ba	0.0153	0.0153	ppb	101.44	1000.	
137 Ba	0.0112	0.0112	ppb	124.73	#VALUE!	
182 W	0.0321	0.0321	ppb ---		#VALUE!	
203 Tl	0.0132	0.0132	ppb	38.72	1000.	
205 Tl	0.0106	0.0106	ppb	60.20	#VALUE!	
208 Pb	0.0094	0.0094	ppb	143.49	1000.	
232 Th	0.0273	0.0273	ppb	13.02	1000.	
238 U	0.0026	0.0026	ppb	40.86	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2621164.80	0.93	2737811.30	95.7	69.5 - 130	
45 Sc	1944184.10	1.53	2016878.10	96.4	69.5 - 130	
72 Ge	410080.72	1.11	420175.84	97.6	69.5 - 130	
159 Tb	3830102.00	0.94	3819393.30	100.3	69.5 - 130	
209 Bi	2417576.30	1.18	2381090.80	101.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000191

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\024_CCV.D\024_CCV.D#
Date Acquired: Jul 28 2014 01:09 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	22.77	ppb	0.63	25	91.08	
11 B	24.91	ppb	1.27	25	99.64	
23 Na	4,886.	ppb	2.19	5,000	97.72	
25 Mg	4,956.	ppb	1.90	5,000	99.12	
27 Al	493.2	ppb	1.24	500	98.64	
28 Si	589.2	ppb	4.12	500	117.84	
29 Si	-269.4	ppb	64.74	500	-53.88	Fail
39 K	4,872.	ppb	1.21	5,000	97.44	
43 Ca	4,940.	ppb	1.78	5,000	98.8	
44 Ca	4,846.	ppb	1.66	5,000	96.92	
51 V	24.08	ppb	1.32	25	96.32	
52 Cr	24.09	ppb	1.28	25	96.36	
53 Cr	23.11	ppb	2.36	25	92.44	
55 Mn	24.22	ppb	1.28	25	96.88	
56 Fe	4,869.	ppb	1.80	5,000	97.38	
57 Fe	4,764.	ppb	1.59	5,000	95.28	
59 Co	24.41	ppb	0.53	25	97.64	
60 Ni	24.42	ppb	0.92	25	97.68	
63 Cu	24.37	ppb	1.74	25	97.48	
65 Cu	24.46	ppb	0.71	25	97.84	
66 Zn	23.97	ppb	2.87	25	95.88	
68 Zn	22.83	ppb	4.65	25	91.32	
75 As	24.41	ppb	1.98	25	97.64	
82 Se	25.24	ppb	2.02	25	100.96	
88 Sr	24.89	ppb	2.24	25	99.56	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.28	ppb	1.37	25	101.12	
107 Ag	25.01	ppb	2.06	25	100.04	
109 Ag	24.8	ppb	2.04	25	99.2	
111 Cd	24.48	ppb	0.53	25	97.92	
114 Cd	25.05	ppb	1.26	25	100.2	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.21	ppb	2.41	25	96.84	
120 Sn	24.44	ppb	2.19	25	97.76	
121 Sb	23.89	ppb	2.30	25	95.56	
123 Sb	24.13	ppb	3.07	25	96.52	
135 Ba	24.21	ppb	3.26	25	96.84	
137 Ba	24.18	ppb	1.79	25	96.72	
182 W	24.61	ppb	2.89	25	98.44	
203 Tl	24.59	ppb	1.46	25	98.36	
205 Tl	24.53	ppb	2.29	25	98.12	
208 Pb	24.45	ppb	1.29	25	97.8	
232 Th	24.28	ppb	2.17	25	97.12	
238 U	24.2	ppb	1.81	25	96.8	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2645655.80	0.58	2737811.30	96.6	80 - 120.4	
45 Sc	1963372.50	1.06	2016878.10	97.3	80 - 120.4	
72 Ge	411873.72	1.34	420175.84	98.0	80 - 120.4	
159 Tb	3862731.50	1.84	3819393.30	101.1	80 - 120.4	
209 Bi	2408913.00	1.64	2381090.80	101.2	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000192

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\025_CCB.D\025_CCB.D#
Date Acquired: Jul 28 2014 01:12 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0019	ppb	108.31	1.00	
11 B	0.4088	ppb	4.09	1.00	
23 Na	6.722	ppb	21.60	1.00	
25 Mg	1.941	ppb	58.63	1.00	
27 Al	0.6787	ppb	168.56	1.00	
28 Si	84.72	ppb	124.06	1.00	
29 Si	-623.3	ppb	33.24	1.00	Fail-DoD
39 K	-14.29	ppb	27.08	1.00	
43 Ca	1.316	ppb	408.97	1.00	
44 Ca	3.354	ppb	40.40	1.00	
51 V	0.0861	ppb	80.40	1.00	
52 Cr	-0.0014	ppb	938.17	1.00	
53 Cr	-0.2125	ppb	53.41	1.00	
55 Mn	-0.0472	ppb	10.81	1.00	
56 Fe	0.9408	ppb	177.51	1.00	
57 Fe	-15.94	ppb	20.40	1.00	
59 Co	-0.0146	ppb	52.07	1.00	
60 Ni	-0.0206	ppb	40.60	1.00	
63 Cu	0.0882	ppb	13.56	1.00	
65 Cu	0.1031	ppb	4.87	1.00	
66 Zn	0.0554	ppb	21.97	1.00	
68 Zn	-1.375	ppb	11.70	1.00	
75 As	-0.0302	ppb	409.20	1.00	
82 Se	0.0687	ppb	388.27	1.00	
88 Sr	-0.0027	ppb	277.88	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.4226	ppb	3.59	1.00	
107 Ag	0.0036	ppb	83.94	1.00	
109 Ag	0.0017	ppb	105.22	1.00	
111 Cd	-0.2266	ppb	6.47	1.00	
114 Cd	0.0074	ppb	17.39	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0687	ppb	31.14	1.00	
120 Sn	0.0677	ppb	45.27	1.00	
121 Sb	0.0205	ppb	4.81	1.00	
123 Sb	0.0179	ppb	32.42	1.00	
135 Ba	-0.0063	ppb	114.34	1.00	
137 Ba	-0.0061	ppb	149.89	1.00	
182 W	0.1211	ppb	3.31	1.00	
203 Tl	0.0112	ppb	37.32	1.00	
205 Tl	0.014	ppb	56.02	1.00	
208 Pb	0.0068	ppb	141.48	1.00	
232 Th	0.0561	ppb	30.91	1.00	
238 U	0.0026	ppb	75.03	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2655791.80	1.45	2737811.30	97.0	79.5 - 120	
45 Sc	1962608.80	0.84	2016878.10	97.3	79.5 - 120	
72 Ge	412420.91	0.49	420175.84	98.2	79.5 - 120	
159 Tb	3873688.30	0.30	3819393.30	101.4	79.5 - 120	
209 Bi	2445694.50	0.95	2381090.80	102.7	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000193

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\026SMPL.D\026SMPL.D#
Date Acquired: Jul 28 2014 01:15 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4625-006
Misc Info:
Vial Number: 3102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0049	0.0049	ppb	21.10	100.	
11 B	3.692	3.692	ppb	2.70	1000.	
23 Na	11,860.	11,860.	ppb	2.89	200000.	
25 Mg	763.3	763.3	ppb	3.17	200000.	
27 Al	19.09	19.09	ppb	3.17	200000.	
28 Si	983.1	983.1	ppb	12.29	#VALUE!	
29 Si	195.2	195.2	ppb	246.16	10000.	
39 K	758.1	758.1	ppb	4.24	200000.	
43 Ca	5,823.	5,823.	ppb	1.98	#VALUE!	
44 Ca	5,902.	5,902.	ppb	2.69	200000.	
51 V	0.2368	0.2368	ppb	30.29	1000.	
52 Cr	0.2894	0.2894	ppb	14.07	1000.	
53 Cr	-1.307	-1.307	ppb	26.63	#VALUE!	
55 Mn	26.71	26.71	ppb	1.73	1000.	
56 Fe	288.7	288.7	ppb	3.34	#VALUE!	
57 Fe	264.	264.	ppb	1.39	100000.	
59 Co	0.0273	0.0273	ppb	31.45	1000.	
60 Ni	0.2143	0.2143	ppb	4.79	1000.	
63 Cu	261.2	261.2	ppb	1.89	#VALUE!	
65 Cu	265.5	265.5	ppb	2.80	1000.	
66 Zn	36.82	36.82	ppb	0.41	1000.	
68 Zn	34.87	34.87	ppb	2.61	#VALUE!	
75 As	0.6404	0.6404	ppb	23.70	1000.	
82 Se	0.3855	0.3855	ppb	32.74	1000.	
88 Sr	32.51	32.51	ppb	1.92	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.3656	0.3656	ppb	1.37	1000.	
107 Ag	0.0129	0.0129	ppb	35.85	500.	
109 Ag	0.0106	0.0106	ppb	29.19	#VALUE!	
111 Cd	-0.2396	-0.2396	ppb	15.90	#VALUE!	
114 Cd	0.0195	0.0195	ppb	16.96	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1725	0.1725	ppb	18.49	1000.	
120 Sn	0.1414	0.1414	ppb	8.77	#VALUE!	
121 Sb	0.0408	0.0408	ppb	8.82	#VALUE!	
123 Sb	0.0286	0.0286	ppb	23.59	1000.	
135 Ba	1.063	1.063	ppb	3.45	1000.	
137 Ba	1.064	1.064	ppb	1.09	#VALUE!	
182 W	0.0478	0.0478	ppb ---		#VALUE!	
203 Tl	0.0138	0.0138	ppb	41.80	1000.	
205 Tl	0.0115	0.0115	ppb	54.85	#VALUE!	
208 Pb	65.65	65.65	ppb	2.44	1000.	
232 Th	0.1438	0.1438	ppb	20.65	1000.	
238 U	0.0351	0.0351	ppb	12.06	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2594383.50	1.83	2737811.30	94.8	69.5 - 130	
45 Sc	1949847.30	3.00	2016878.10	96.7	69.5 - 130	
72 Ge	410530.50	2.24	420175.84	97.7	69.5 - 130	
159 Tb	3896625.30	2.47	3819393.30	102.0	69.5 - 130	
209 Bi	2454958.00	2.58	2381090.80	103.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000194

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\027SMPL.D\027SMPL.D#
Date Acquired: Jul 28 2014 01:19 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4625-9 UNDIG
Misc Info:
Vial Number: 3103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0082	0.0082	ppb	27.75	100.	
11 B	3.961	3.961	ppb	4.19	1000.	
23 Na	11,730.	11,730.	ppb	0.16	200000.	
25 Mg	800.7	800.7	ppb	0.34	200000.	
27 Al	149.9	149.9	ppb	4.36	200000.	
28 Si	917.7	917.7	ppb	10.47	#VALUE!	
29 Si	199.8	199.8	ppb	9.90	10000.	
39 K	792.	792.	ppb	0.64	200000.	
43 Ca	5,628.	5,628.	ppb	1.39	#VALUE!	
44 Ca	5,810.	5,810.	ppb	0.51	200000.	
51 V	0.3724	0.3724	ppb	8.03	1000.	
52 Cr	0.3605	0.3605	ppb	9.20	1000.	
53 Cr	-1.189	-1.189	ppb	8.93	#VALUE!	
55 Mn	91.9	91.9	ppb	1.02	1000.	
56 Fe	209.9	209.9	ppb	0.63	#VALUE!	
57 Fe	183.	183.	ppb	5.44	100000.	
59 Co	0.4907	0.4907	ppb	3.84	1000.	
60 Ni	1.666	1.666	ppb	4.04	1000.	
63 Cu	350.6	350.6	ppb	1.32	#VALUE!	
65 Cu	361.	361.	ppb	0.70	1000.	
66 Zn	853.6	853.6	ppb	0.92	1000.	
68 Zn	842.4	842.4	ppb	1.10	#VALUE!	
75 As	0.8107	0.8107	ppb	18.44	1000.	
82 Se	0.4101	0.4101	ppb	49.70	1000.	
88 Sr	32.91	32.91	ppb	0.74	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.2802	0.2802	ppb	6.12	1000.	
107 Ag	0.048	0.048	ppb	8.03	500.	
109 Ag	0.0333	0.0333	ppb	8.13	#VALUE!	
111 Cd	-0.1858	-0.1858	ppb	11.54	#VALUE!	
114 Cd	0.0571	0.0571	ppb	11.69	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	2.078	2.078	ppb	4.10	1000.	
120 Sn	2.063	2.063	ppb	1.22	#VALUE!	
121 Sb	0.0981	0.0981	ppb	13.32	#VALUE!	
123 Sb	0.0867	0.0867	ppb	5.30	1000.	
135 Ba	2.134	2.134	ppb	4.40	1000.	
137 Ba	2.122	2.122	ppb	7.00	#VALUE!	
182 W	0.03	0.03	ppb ---		#VALUE!	
203 Tl	0.0143	0.0143	ppb	41.40	1000.	
205 Tl	0.0127	0.0127	ppb	9.41	#VALUE!	
208 Pb	116.2	116.2	ppb	1.27	1000.	
232 Th	0.1131	0.1131	ppb	19.09	1000.	
238 U	0.0444	0.0444	ppb	4.58	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2574660.50	1.11	2737811.30	94.0	69.5 - 130	
45 Sc	1937941.60	0.80	2016878.10	96.1	69.5 - 130	
72 Ge	405487.75	0.78	420175.84	96.5	69.5 - 130	
159 Tb	3853855.30	0.48	3819393.30	100.9	69.5 - 130	
209 Bi	2409853.80	0.48	2381090.80	101.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000195

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\028SMPL.D\028SMPL.D#
Date Acquired: Jul 28 2014 01:22 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4952-005
Misc Info:
Vial Number: 3104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0033	0.0033	ppb	70.48	100.	
11 B	3.783	3.783	ppb	3.17	1000.	
23 Na	12,040.	12,040.	ppb	1.81	200000.	
25 Mg	759.8	759.8	ppb	1.22	200000.	
27 Al	15.1	15.1	ppb	6.33	200000.	
28 Si	923.1	923.1	ppb	10.72	#VALUE!	
29 Si	276.6	276.6	ppb	57.41	10000.	
39 K	813.2	813.2	ppb	0.54	200000.	
43 Ca	6,450.	6,450.	ppb	1.46	#VALUE!	
44 Ca	6,563.	6,563.	ppb	0.82	200000.	
51 V	0.2047	0.2047	ppb	38.62	1000.	
52 Cr	0.2478	0.2478	ppb	8.51	1000.	
53 Cr	-1.355	-1.355	ppb	27.18	#VALUE!	
55 Mn	8.244	8.244	ppb	2.07	1000.	
56 Fe	45.4	45.4	ppb	5.57	#VALUE!	
57 Fe	28.26	28.26	ppb	20.74	100000.	
59 Co	0.0188	0.0188	ppb	24.64	1000.	
60 Ni	1.157	1.157	ppb	4.48	1000.	
63 Cu	115.9	115.9	ppb	1.55	#VALUE!	
65 Cu	117.9	117.9	ppb	0.89	1000.	
66 Zn	45.58	45.58	ppb	0.74	1000.	
68 Zn	42.98	42.98	ppb	1.86	#VALUE!	
75 As	0.7154	0.7154	ppb	34.99	1000.	
82 Se	0.4819	0.4819	ppb	40.82	1000.	
88 Sr	38.48	38.48	ppb	2.03	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.2638	0.2638	ppb	6.43	1000.	
107 Ag	0.0237	0.0237	ppb	12.37	500.	
109 Ag	0.0231	0.0231	ppb	15.09	#VALUE!	
111 Cd	-0.2606	-0.2606	ppb	9.63	#VALUE!	
114 Cd	0.0081	0.0081	ppb	63.88	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.2493	0.2493	ppb	4.32	1000.	
120 Sn	0.264	0.264	ppb	6.34	#VALUE!	
121 Sb	0.0607	0.0607	ppb	20.73	#VALUE!	
123 Sb	0.0514	0.0514	ppb	6.42	1000.	
135 Ba	1.56	1.56	ppb	3.91	1000.	
137 Ba	1.497	1.497	ppb	3.42	#VALUE!	
182 W	0.0267	0.0267	ppb ---		#VALUE!	
203 Tl	0.0109	0.0109	ppb	47.01	1000.	
205 Tl	0.0121	0.0121	ppb	11.58	#VALUE!	
208 Pb	16.45	16.45	ppb	1.01	1000.	
232 Th	0.0986	0.0986	ppb	5.04	1000.	
238 U	0.0205	0.0205	ppb	13.31	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2609168.00	2.06	2737811.30	95.3	69.5 - 130	
45 Sc	1930696.60	1.13	2016878.10	95.7	69.5 - 130	
72 Ge	407896.31	1.68	420175.84	97.1	69.5 - 130	
159 Tb	3852299.00	1.15	3819393.30	100.9	69.5 - 130	
209 Bi	2409367.50	0.92	2381090.80	101.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000196

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\029_CCV.D\029_CCV.D#
Date Acquired: Jul 28 2014 01:25 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	22.8	ppb	2.03	25	91.2	
11 B	24.42	ppb	1.22	25	97.68	
23 Na	4,869.	ppb	0.84	5,000	97.38	
25 Mg	4,953.	ppb	1.50	5,000	99.06	
27 Al	491.1	ppb	2.65	500	98.22	
28 Si	581.6	ppb	20.46	500	116.32	
29 Si	-219.6	ppb	227.37	500	-43.92	Fail
39 K	4,853.	ppb	2.29	5,000	97.06	
43 Ca	4,855.	ppb	1.26	5,000	97.1	
44 Ca	4,830.	ppb	1.08	5,000	96.6	
51 V	24.31	ppb	1.93	25	97.24	
52 Cr	24.41	ppb	2.02	25	97.64	
53 Cr	24.3	ppb	1.84	25	97.2	
55 Mn	24.42	ppb	1.53	25	97.68	
56 Fe	4,908.	ppb	1.45	5,000	98.16	
57 Fe	4,784.	ppb	1.20	5,000	95.68	
59 Co	24.47	ppb	0.69	25	97.88	
60 Ni	24.3	ppb	2.36	25	97.2	
63 Cu	24.55	ppb	1.55	25	98.2	
65 Cu	24.75	ppb	1.12	25	99	
66 Zn	24.39	ppb	1.57	25	97.56	
68 Zn	23.62	ppb	1.70	25	94.48	
75 As	24.52	ppb	2.35	25	98.08	
82 Se	24.74	ppb	2.11	25	98.96	
88 Sr	25.07	ppb	2.52	25	100.28	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.88	ppb	1.57	25	99.52	
107 Ag	25.09	ppb	2.37	25	100.36	
109 Ag	25.15	ppb	1.22	25	100.6	
111 Cd	24.9	ppb	2.35	25	99.6	
114 Cd	24.95	ppb	1.40	25	99.8	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.91	ppb	1.08	25	95.64	
120 Sn	24.19	ppb	2.14	25	96.76	
121 Sb	23.94	ppb	1.04	25	95.76	
123 Sb	23.97	ppb	0.72	25	95.88	
135 Ba	24.06	ppb	0.91	25	96.24	
137 Ba	23.86	ppb	1.05	25	95.44	
182 W	24.39	ppb	1.78	25	97.56	
203 Tl	24.94	ppb	1.27	25	99.76	
205 Tl	24.58	ppb	1.83	25	98.32	
208 Pb	24.6	ppb	1.18	25	98.4	
232 Th	23.83	ppb	3.07	25	95.32	
238 U	24.49	ppb	1.35	25	97.96	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2700242.00	1.70	2737811.30	98.6	80 - 120.4	
45 Sc	2007121.00	1.56	2016878.10	99.5	80 - 120.4	
72 Ge	416318.63	1.38	420175.84	99.1	80 - 120.4	
159 Tb	3931406.30	1.33	3819393.30	102.9	80 - 120.4	
209 Bi	2427983.00	1.49	2381090.80	102.0	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000197

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\030_CCB.D\030_CCB.D#
Date Acquired: Jul 28 2014 01:29 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0041	ppb	64.63	1.00	
11 B	0.364	ppb	5.38	1.00	
23 Na	4.432	ppb	29.31	1.00	
25 Mg	0.7261	ppb	35.89	1.00	
27 Al	-0.0798	ppb	27.20	1.00	
28 Si	122.4	ppb	89.46	1.00	
29 Si	-589.9	ppb	48.43	1.00	Fail-DoD
39 K	-13.19	ppb	28.93	1.00	
43 Ca	5.365	ppb	97.47	1.00	
44 Ca	-1.215	ppb	225.35	1.00	
51 V	0.1509	ppb	60.23	1.00	
52 Cr	-0.0048	ppb	493.38	1.00	
53 Cr	-0.2929	ppb	110.99	1.00	
55 Mn	-0.0318	ppb	28.18	1.00	
56 Fe	0.8477	ppb	72.95	1.00	
57 Fe	-17.95	ppb	12.66	1.00	
59 Co	-0.0117	ppb	22.52	1.00	
60 Ni	0.0028	ppb	861.59	1.00	
63 Cu	0.0633	ppb	41.56	1.00	
65 Cu	0.0961	ppb	15.94	1.00	
66 Zn	0.0115	ppb	640.84	1.00	
68 Zn	-1.537	ppb	5.87	1.00	
75 As	0.0875	ppb	139.94	1.00	
82 Se	0.3295	ppb	27.92	1.00	
88 Sr	0.005	ppb	49.84	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.153	ppb	10.86	1.00	
107 Ag	0.0019	ppb	24.38	1.00	
109 Ag	0.0069	ppb	85.30	1.00	
111 Cd	-0.1659	ppb	21.01	1.00	
114 Cd	0.0007	ppb	429.87	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0781	ppb	23.47	1.00	
120 Sn	0.0765	ppb	14.87	1.00	
121 Sb	0.0192	ppb	18.65	1.00	
123 Sb	0.02	ppb	23.38	1.00	
135 Ba	0.0013	ppb	338.00	1.00	
137 Ba	-0.005	ppb	43.97	1.00	
182 W	0.1128	ppb	14.97	1.00	
203 Tl	0.011	ppb	104.46	1.00	
205 Tl	0.0134	ppb	50.40	1.00	
208 Pb	0.0044	ppb	156.25	1.00	
232 Th	0.0777	ppb	29.14	1.00	
238 U	0.0029	ppb	55.39	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2682159.30	1.06	2737811.30	98.0	79.5 - 120	
45 Sc	2016224.10	0.69	2016878.10	100.0	79.5 - 120	
72 Ge	419962.59	0.63	420175.84	99.9	79.5 - 120	
159 Tb	3951230.00	0.73	3819393.30	103.5	79.5 - 120	
209 Bi	2480747.30	0.68	2381090.80	104.2	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000198

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\031SMPL.D\031SMPL.D#
Date Acquired: Jul 28 2014 01:32 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4862-011
Misc Info: DILUTION 1.6/8
Vial Number: 2101
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.2828	0.0566	ppb	15.14	100.	
11 B	7.915	1.583	ppb	14.21	1000.	
23 Na	3,200.5	640.1	ppb	1.10	200000.	
25 Mg	5,190.	1,038.	ppb	1.06	200000.	
27 Al	18,525.	3,705.	ppb	0.73	200000.	
28 Si	17,165.	3,433.	ppb	2.52	#VALUE!	
29 Si	16,500.	3,300.	ppb	7.35	10000.	
39 K	4,237.	847.4	ppb	1.93	200000.	
43 Ca	8,785.	1,757.	ppb	3.36	#VALUE!	
44 Ca	8,830.	1,766.	ppb	1.16	200000.	
51 V	24.115	4.823	ppb	1.49	1000.	
52 Cr	4.264	0.8528	ppb	3.94	1000.	
53 Cr	71.3	14.26	ppb	5.55	#VALUE!	
55 Mn	463.15	92.63	ppb	1.22	1000.	
56 Fe	9,125.	1,825.	ppb	1.50	#VALUE!	
57 Fe	8,770.	1,754.	ppb	1.04	100000.	
59 Co	6.75	1.35	ppb	1.42	1000.	
60 Ni	4.0805	0.8161	ppb	1.19	1000.	
63 Cu	18.795	3.759	ppb	0.98	#VALUE!	
65 Cu	19.045	3.809	ppb	1.77	1000.	
66 Zn	48.18	9.636	ppb	1.50	1000.	
68 Zn	43.285	8.657	ppb	2.39	#VALUE!	
75 As	1.178	0.2356	ppb	130.81	1000.	
82 Se	1.1715	0.2343	ppb	30.70	1000.	
88 Sr	82.35	16.47	ppb	1.14	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.052	0.2104	ppb	6.49	1000.	
107 Ag	0.0498	0.01	ppb	33.95	500.	
109 Ag	0.0635	0.0127	ppb	18.95	#VALUE!	
111 Cd	-0.967	-0.1934	ppb	28.82	#VALUE!	
114 Cd	0.0972	0.0194	ppb	17.71	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.7975	0.1595	ppb	7.08	1000.	
120 Sn	0.8145	0.1629	ppb	15.78	#VALUE!	
121 Sb	0.1583	0.0317	ppb	8.34	#VALUE!	
123 Sb	0.1616	0.0323	ppb	5.64	1000.	
135 Ba	200.05	40.01	ppb	1.81	1000.	
137 Ba	199.9	39.98	ppb	1.69	#VALUE!	
182 W	0.3226	0.0645	ppb ---		#VALUE!	
203 Tl	0.112	0.0224	ppb	17.46	1000.	
205 Tl	0.1051	0.021	ppb	9.69	#VALUE!	
208 Pb	5.64	1.128	ppb	1.55	1000.	
232 Th	1.683	0.3366	ppb	17.69	1000.	
238 U	0.3872	0.0774	ppb	9.29	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2751889.00	1.46	2737811.30	100.5	69.5 - 130	
45 Sc	2032650.60	1.09	2016878.10	100.8	69.5 - 130	
72 Ge	421228.31	1.55	420175.84	100.3	69.5 - 130	
159 Tb	4015395.80	1.02	3819393.30	105.1	69.5 - 130	
209 Bi	2516747.50	1.28	2381090.80	105.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000199

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\032SMPL.D\032SMPL.D#
Date Acquired: Jul 28 2014 01:35 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4862-011L
Misc Info: DILUTION 0.4/10
Vial Number: 2102
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.2878	0.0115	ppb	12.22	100.	
11 B	9.6325	0.3853	ppb	6.08	1000.	
23 Na	3,425.	137.	ppb	1.94	200000.	
25 Mg	5,200.	208.	ppb	0.10	200000.	
27 Al	18,805.	752.2	ppb	0.71	200000.	
28 Si	19,075.	763.	ppb	1.61	#VALUE!	
29 Si	-2,702.5	-108.1	ppb	87.75	10000.	LOW
39 K	3,885.	155.4	ppb	0.66	200000.	
43 Ca	9,022.5	360.9	ppb	3.83	#VALUE!	
44 Ca	8,810.	352.4	ppb	2.92	200000.	
51 V	27.375	1.095	ppb	6.25	1000.	
52 Cr	4.165	0.1666	ppb	20.23	1000.	
53 Cr	98.1	3.924	ppb	3.50	#VALUE!	
55 Mn	464.25	18.57	ppb	1.42	1000.	
56 Fe	9,492.5	379.7	ppb	1.28	#VALUE!	
57 Fe	8,272.5	330.9	ppb	0.87	100000.	
59 Co	6.6125	0.2645	ppb	2.82	1000.	
60 Ni	3.775	0.151	ppb	13.51	1000.	
63 Cu	19.5675	0.7827	ppb	4.76	#VALUE!	
65 Cu	19.3575	0.7743	ppb	4.61	1000.	
66 Zn	47.525	1.901	ppb	8.51	1000.	
68 Zn	13.135	0.5254	ppb	62.89	#VALUE!	
75 As	5.7225	0.2289	ppb	33.82	1000.	
82 Se	9.6325	0.3853	ppb	24.92	1000.	
88 Sr	81.775	3.271	ppb	1.78	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	2.2425	0.0897	ppb	12.02	1000.	
107 Ag	0.061	0.0024	ppb	63.95	500.	
109 Ag	0.0984	0.0039	ppb	70.05	#VALUE!	
111 Cd	-5.2925	-0.2117	ppb	26.97	#VALUE!	
114 Cd	0.2159	0.0086	ppb	39.68	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.8188	0.0328	ppb	18.50	1000.	
120 Sn	0.8578	0.0343	ppb	10.74	#VALUE!	
121 Sb	0.2266	0.0091	ppb	37.61	#VALUE!	
123 Sb	-0.012	-0.0005	ppb	1184.70	1000.	
135 Ba	204.6	8.184	ppb	0.97	1000.	
137 Ba	202.7	8.108	ppb	0.70	#VALUE!	
182 W	0.7788	0.0312	ppb ---		#VALUE!	
203 Tl	0.2089	0.0084	ppb	11.51	1000.	
205 Tl	0.1089	0.0044	ppb	44.57	#VALUE!	
208 Pb	5.7075	0.2283	ppb	4.66	1000.	
232 Th	1.2395	0.0496	ppb	20.49	1000.	
238 U	0.384	0.0154	ppb	18.19	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2739312.80	2.40	2737811.30	100.1	69.5 - 130	
45 Sc	2047406.60	0.68	2016878.10	101.5	69.5 - 130	
72 Ge	427030.19	0.50	420175.84	101.6	69.5 - 130	
159 Tb	4029624.00	0.75	3819393.30	105.5	69.5 - 130	
209 Bi	2514668.00	1.37	2381090.80	105.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000200

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\033SMPL.D\033SMPL.D#
Date Acquired: Jul 28 2014 01:38 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4862-011A
Misc Info: DILUTION 1.6/8
Vial Number: 2103
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	9.32	1.864	ppb	1.39	100.	
11 B	189.7	37.94	ppb	2.11	1000.	
23 Na	12,710.	2,542.	ppb	0.50	200000.	
25 Mg	6,150.	1,230.	ppb	0.38	200000.	
27 Al	21,245.	4,249.	ppb	0.65	200000.	
28 Si	21,980.	4,396.	ppb	0.82	#VALUE!	
29 Si	22,400.	4,480.	ppb	1.53	10000.	
39 K	13,790.	2,758.	ppb	0.65	200000.	
43 Ca	9,800.	1,960.	ppb	2.41	#VALUE!	
44 Ca	9,720.	1,944.	ppb	0.72	200000.	
51 V	71.4	14.28	ppb	1.68	1000.	
52 Cr	53.25	10.65	ppb	0.70	1000.	
53 Cr	126.75	25.35	ppb	2.90	#VALUE!	
55 Mn	480.8	96.16	ppb	0.23	1000.	
56 Fe	10,000.	2,000.	ppb	0.33	#VALUE!	
57 Fe	9,670.	1,934.	ppb	0.54	100000.	
59 Co	16.46	3.292	ppb	2.00	1000.	
60 Ni	23.15	4.63	ppb	0.59	1000.	
63 Cu	47.385	9.477	ppb	0.85	#VALUE!	
65 Cu	48.59	9.718	ppb	1.44	1000.	
66 Zn	141.15	28.23	ppb	0.70	1000.	
68 Zn	134.95	26.99	ppb	2.33	#VALUE!	
75 As	47.52	9.504	ppb	2.99	1000.	
82 Se	49.335	9.867	ppb	1.44	1000.	
88 Sr	128.95	25.79	ppb	1.62	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	48.585	9.717	ppb	1.79	1000.	
107 Ag	9.995	1.999	ppb	1.89	500.	
109 Ag	9.82	1.964	ppb	1.63	#VALUE!	
111 Cd	8.875	1.775	ppb	2.61	#VALUE!	
114 Cd	9.92	1.984	ppb	2.84	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	46.975	9.395	ppb	1.92	1000.	
120 Sn	46.285	9.257	ppb	1.13	#VALUE!	
121 Sb	9.685	1.937	ppb	1.39	#VALUE!	
123 Sb	9.66	1.932	ppb	0.25	1000.	
135 Ba	219.05	43.81	ppb	0.60	1000.	
137 Ba	222.05	44.41	ppb	0.31	#VALUE!	
182 W	48.44	9.688	ppb ---		#VALUE!	
203 Tl	10.155	2.031	ppb	2.54	1000.	
205 Tl	9.615	1.923	ppb	1.10	#VALUE!	
208 Pb	15.425	3.085	ppb	0.47	1000.	
232 Th	11.31	2.262	ppb	1.56	1000.	
238 U	10.13	2.026	ppb	0.80	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2735763.00	0.80	2737811.30	99.9	69.5 - 130	
45 Sc	2013474.40	0.14	2016878.10	99.8	69.5 - 130	
72 Ge	419619.72	0.35	420175.84	99.9	69.5 - 130	
159 Tb	3995025.80	0.34	3819393.30	104.6	69.5 - 130	
209 Bi	2470079.30	0.42	2381090.80	103.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000201

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\034SMPL.D\034SMPL.D#
Date Acquired: Jul 28 2014 01:42 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4862-029S
Misc Info: DILUTION 0.4/10
Vial Number: 2104
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	48.375	1.935	ppb	1.20	100.	
11 B	444.75	17.79	ppb	2.99	1000.	
23 Na	36,425.	1,457.	ppb	0.73	200000.	
25 Mg	11,230.	449.2	ppb	0.83	200000.	
27 Al	111,750.	4,470.	ppb	0.89	200000.	
28 Si	64,675.	2,587.	ppb	1.96	#VALUE!	
29 Si	57,525.	2,301.	ppb	4.67	10000.	
39 K	12,460.	498.4	ppb	1.86	200000.	
43 Ca	45,625.	1,825.	ppb	3.32	#VALUE!	
44 Ca	44,825.	1,793.	ppb	1.74	200000.	
51 V	687.	27.48	ppb	0.52	1000.	
52 Cr	242.05	9.682	ppb	0.40	1000.	
53 Cr	332.75	13.31	ppb	4.95	#VALUE!	
55 Mn	5,820.	232.8	ppb	0.40	1000.	
56 Fe	95,025.	3,801.	ppb	0.57	#VALUE!	
57 Fe	92,575.	3,703.	ppb	1.11	100000.	
59 Co	547.75	21.91	ppb	0.57	1000.	
60 Ni	554.25	22.17	ppb	0.25	1000.	
63 Cu	345.	13.8	ppb	0.58	#VALUE!	
65 Cu	354.5	14.18	ppb	1.41	1000.	
66 Zn	649.5	25.98	ppb	2.03	1000.	
68 Zn	669.25	26.77	ppb	1.43	#VALUE!	
75 As	109.725	4.389	ppb	3.06	1000.	
82 Se	107.15	4.286	ppb	3.96	1000.	
88 Sr	724.5	28.98	ppb	1.15	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	268.25	10.73	ppb	1.09	1000.	
107 Ag	52.4	2.096	ppb	2.25	500.	
109 Ag	50.825	2.033	ppb	2.11	#VALUE!	
111 Cd	257.	10.28	ppb	2.14	#VALUE!	
114 Cd	265.25	10.61	ppb	0.58	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	393.	15.72	ppb	0.97	1000.	
120 Sn	395.	15.8	ppb	1.36	#VALUE!	
121 Sb	62.375	2.495	ppb	2.07	#VALUE!	
123 Sb	62.	2.48	ppb	1.79	1000.	
135 Ba	2,715.	108.6	ppb	1.52	1000.	
137 Ba	2,715.	108.6	ppb	1.16	#VALUE!	
182 W	54.725	2.189	ppb ---		#VALUE!	
203 Tl	103.425	4.137	ppb	0.85	1000.	
205 Tl	103.925	4.157	ppb	2.17	#VALUE!	
208 Pb	136.15	5.446	ppb	1.02	1000.	
232 Th	12.16	0.4864	ppb	5.07	1000.	
238 U	94.625	3.785	ppb	1.00	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2749203.30	0.82	2737811.30	100.4	69.5 - 130	
45 Sc	2039151.40	0.84	2016878.10	101.1	69.5 - 130	
72 Ge	425435.53	0.86	420175.84	101.3	69.5 - 130	
159 Tb	3992112.00	0.78	3819393.30	104.5	69.5 - 130	
209 Bi	2516629.50	1.38	2381090.80	105.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000202

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\035SMPL.D\035SMPL.D#
Date Acquired: Jul 28 2014 01:45 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4862-029P
Misc Info: DILUTION 0.4/10
Vial Number: 2105
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	47.95	1.918	ppb	1.74	100.	
11 B	479.75	19.19	ppb	6.98	1000.	
23 Na	37,250.	1,490.	ppb	2.68	200000.	
25 Mg	11,602.5	464.1	ppb	2.02	200000.	
27 Al	119,875.	4,795.	ppb	2.07	200000.	
28 Si	53,600.	2,144.	ppb	10.07	#VALUE!	
29 Si	45,100.	1,804.	ppb	21.37	10000.	
39 K	12,510.	500.4	ppb	3.60	200000.	
43 Ca	46,275.	1,851.	ppb	1.32	#VALUE!	
44 Ca	45,125.	1,805.	ppb	2.62	200000.	
51 V	703.25	28.13	ppb	2.59	1000.	
52 Cr	248.6	9.944	ppb	1.91	1000.	
53 Cr	333.5	13.34	ppb	0.36	#VALUE!	
55 Mn	5,992.5	239.7	ppb	1.53	1000.	
56 Fe	101,750.	4,070.	ppb	1.78	#VALUE!	
57 Fe	98,725.	3,949.	ppb	2.27	100000.	
59 Co	552.75	22.11	ppb	1.77	1000.	
60 Ni	562.25	22.49	ppb	0.94	1000.	
63 Cu	354.	14.16	ppb	3.26	#VALUE!	
65 Cu	363.25	14.53	ppb	0.67	1000.	
66 Zn	672.	26.88	ppb	1.99	1000.	
68 Zn	679.25	27.17	ppb	2.59	#VALUE!	
75 As	108.925	4.357	ppb	6.74	1000.	
82 Se	111.05	4.442	ppb	9.70	1000.	
88 Sr	791.	31.64	ppb	2.20	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	303.75	12.15	ppb	1.97	1000.	
107 Ag	52.1	2.084	ppb	2.08	500.	
109 Ag	51.65	2.066	ppb	1.17	#VALUE!	
111 Cd	261.25	10.45	ppb	1.90	#VALUE!	
114 Cd	264.	10.56	ppb	1.86	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	452.5	18.1	ppb	1.48	1000.	
120 Sn	450.	18.	ppb	2.42	#VALUE!	
121 Sb	53.65	2.146	ppb	2.33	#VALUE!	
123 Sb	53.375	2.135	ppb	2.10	1000.	
135 Ba	2,755.	110.2	ppb	1.97	1000.	
137 Ba	2,767.5	110.7	ppb	1.84	#VALUE!	
182 W	63.85	2.554	ppb ---		#VALUE!	
203 Tl	104.575	4.183	ppb	1.99	1000.	
205 Tl	103.55	4.142	ppb	2.84	#VALUE!	
208 Pb	140.1	5.604	ppb	2.11	1000.	
232 Th	13.195	0.5278	ppb	0.82	1000.	
238 U	104.95	4.198	ppb	1.88	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2788178.50	1.93	2737811.30	101.8	69.5 - 130	
45 Sc	2050247.30	1.74	2016878.10	101.7	69.5 - 130	
72 Ge	427750.50	1.06	420175.84	101.8	69.5 - 130	
159 Tb	4009016.50	1.30	3819393.30	105.0	69.5 - 130	
209 Bi	2529328.00	1.37	2381090.80	106.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000203

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\036SMPL.D\036SMPL.D#
Date Acquired: Jul 28 2014 01:48 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBWHG25IMW1
Misc Info:
Vial Number: 2106
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	-0.0012	-0.0012	ppb	140.96	100.	
11 B	0.4608	0.4608	ppb	33.75	1000.	
23 Na	14.05	14.05	ppb	7.22	200000.	
25 Mg	4.115	4.115	ppb	4.11	200000.	
27 Al	3.049	3.049	ppb	30.25	200000.	
28 Si	131.9	131.9	ppb	4.58	#VALUE!	
29 Si	-389.3	-389.3	ppb	55.15	10000.	LOW
39 K	-11.39	-11.39	ppb	20.40	200000.	
43 Ca	2.775	2.775	ppb	366.85	#VALUE!	
44 Ca	-3.508	-3.508	ppb	58.10	200000.	
51 V	0.1248	0.1248	ppb	43.45	1000.	
52 Cr	0.0548	0.0548	ppb	63.31	1000.	
53 Cr	1.571	1.571	ppb	16.61	#VALUE!	
55 Mn	0.1023	0.1023	ppb	18.04	1000.	
56 Fe	1.822	1.822	ppb	55.27	#VALUE!	
57 Fe	-16.74	-16.74	ppb	29.73	100000.	
59 Co	0.0021	0.0021	ppb	242.08	1000.	
60 Ni	0.0179	0.0179	ppb	58.97	1000.	
63 Cu	0.1213	0.1213	ppb	8.72	#VALUE!	
65 Cu	0.1251	0.1251	ppb	12.86	1000.	
66 Zn	0.3535	0.3535	ppb	15.53	1000.	
68 Zn	-1.076	-1.076	ppb	28.30	#VALUE!	
75 As	0.0646	0.0646	ppb	173.04	1000.	
82 Se	0.2388	0.2388	ppb	217.42	1000.	
88 Sr	0.0097	0.0097	ppb	74.18	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.075	0.075	ppb	23.19	1000.	
107 Ag	-0.0001	-0.0001	ppb	888.23	500.	
109 Ag	0.0017	0.0017	ppb	111.22	#VALUE!	
111 Cd	-0.2157	-0.2157	ppb	6.08	#VALUE!	
114 Cd	0.0022	0.0022	ppb	219.60	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.0839	0.0839	ppb	11.63	1000.	
120 Sn	0.0874	0.0874	ppb	16.86	#VALUE!	
121 Sb	0.0049	0.0049	ppb	113.86	#VALUE!	
123 Sb	0.0037	0.0037	ppb	203.88	1000.	
135 Ba	0.1208	0.1208	ppb	53.97	1000.	
137 Ba	0.0747	0.0747	ppb	37.72	#VALUE!	
182 W	0.0303	0.0303	ppb ---		#VALUE!	
203 Tl	0.0046	0.0046	ppb	49.35	1000.	
205 Tl	0.0049	0.0049	ppb	58.37	#VALUE!	
208 Pb	0.0307	0.0307	ppb	73.66	1000.	
232 Th	0.0101	0.0101	ppb	20.09	1000.	
238 U	0.0003	0.0003	ppb	155.58	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2734490.30	0.77	2737811.30	99.9	69.5 - 130	
45 Sc	2020404.80	0.81	2016878.10	100.2	69.5 - 130	
72 Ge	424010.22	1.06	420175.84	100.9	69.5 - 130	
159 Tb	3950660.00	0.80	3819393.30	103.4	69.5 - 130	
209 Bi	2486919.30	0.26	2381090.80	104.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000204

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\037SMPL.D\037SMPL.D#
Date Acquired: Jul 28 2014 01:51 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSWHG25IMW1
Misc Info: DILUTION 1.6/8
Vial Number: 2107
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	43.955	8.791	ppb	1.79	100.	
11 B	424.85	84.97	ppb	1.39	1000.	
23 Na	7,205.	1,441.	ppb	1.00	200000.	
25 Mg	4,817.	963.4	ppb	0.57	200000.	
27 Al	1,995.5	399.1	ppb	2.42	200000.	
28 Si	4,874.	974.8	ppb	9.38	#VALUE!	
29 Si	2,348.	469.6	ppb	67.76	10000.	
39 K	9,455.	1,891.	ppb	1.00	200000.	
43 Ca	2,742.	548.4	ppb	7.77	#VALUE!	
44 Ca	2,039.	407.8	ppb	1.78	200000.	
51 V	484.1	96.82	ppb	1.27	1000.	
52 Cr	194.75	38.95	ppb	0.53	1000.	
53 Cr	201.45	40.29	ppb	0.59	#VALUE!	
55 Mn	489.65	97.93	ppb	0.25	1000.	
56 Fe	1,087.5	217.5	ppb	1.34	#VALUE!	
57 Fe	906.5	181.3	ppb	2.13	100000.	
59 Co	491.5	98.3	ppb	1.37	1000.	
60 Ni	499.1	99.82	ppb	0.46	1000.	
63 Cu	241.85	48.37	ppb	0.49	#VALUE!	
65 Cu	243.6	48.72	ppb	1.08	1000.	
66 Zn	497.45	99.49	ppb	1.31	1000.	
68 Zn	528.	105.6	ppb	2.24	#VALUE!	
75 As	98.15	19.63	ppb	0.16	1000.	
82 Se	100.75	20.15	ppb	1.78	1000.	
88 Sr	483.8	96.76	ppb	0.74	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	283.3	56.66	ppb	1.33	1000.	
107 Ag	50.15	10.03	ppb	1.32	500.	
109 Ag	50.25	10.05	ppb	1.39	#VALUE!	
111 Cd	236.05	47.21	ppb	0.58	#VALUE!	
114 Cd	237.15	47.43	ppb	0.91	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	458.65	91.73	ppb	0.40	1000.	
120 Sn	458.85	91.77	ppb	0.60	#VALUE!	
121 Sb	95.65	19.13	ppb	1.62	#VALUE!	
123 Sb	96.45	19.29	ppb	0.85	1000.	
135 Ba	1,904.5	380.9	ppb	1.10	1000.	
137 Ba	1,908.5	381.7	ppb	0.70	#VALUE!	
182 W	90.9	18.18	ppb ---		#VALUE!	
203 Tl	98.55	19.71	ppb	1.31	1000.	
205 Tl	97.05	19.41	ppb	1.11	#VALUE!	
208 Pb	98.45	19.69	ppb	1.40	1000.	
232 Th	0.5395	0.1079	ppb	15.72	1000.	
238 U	95.85	19.17	ppb	1.16	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2817745.80	1.72	2737811.30	102.9	69.5 - 130	
45 Sc	2043512.00	1.60	2016878.10	101.3	69.5 - 130	
72 Ge	422631.13	1.27	420175.84	100.6	69.5 - 130	
159 Tb	3999548.80	1.51	3819393.30	104.7	69.5 - 130	
209 Bi	2493790.50	1.45	2381090.80	104.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000205

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\038SMPL.D\038SMPL.D#
Date Acquired: Jul 28 2014 01:54 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5410-001
Misc Info:
Vial Number: 2108
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0323	0.0323	ppb	14.68	100.	
11 B	16.01	16.01	ppb	2.31	1000.	
23 Na	14,380.	14,380.	ppb	1.15	200000.	
25 Mg	1,882.	1,882.	ppb	1.65	200000.	
27 Al	546.	546.	ppb	0.40	200000.	
28 Si	2,435.	2,435.	ppb	3.51	#VALUE!	
29 Si	2,228.	2,228.	ppb	10.92	10000.	
39 K	989.5	989.5	ppb	0.77	200000.	
43 Ca	2,357.	2,357.	ppb	1.46	#VALUE!	
44 Ca	2,386.	2,386.	ppb	0.20	200000.	
51 V	1.787	1.787	ppb	1.28	1000.	
52 Cr	1.344	1.344	ppb	1.82	1000.	
53 Cr	2.084	2.084	ppb	11.44	#VALUE!	
55 Mn	55.81	55.81	ppb	0.43	1000.	
56 Fe	1,418.	1,418.	ppb	0.13	#VALUE!	
57 Fe	1,364.	1,364.	ppb	0.47	100000.	
59 Co	0.9106	0.9106	ppb	3.97	1000.	
60 Ni	1.83	1.83	ppb	3.44	1000.	
63 Cu	1.091	1.091	ppb	4.31	#VALUE!	
65 Cu	1.043	1.043	ppb	1.34	1000.	
66 Zn	7.265	7.265	ppb	2.15	1000.	
68 Zn	5.63	5.63	ppb	3.81	#VALUE!	
75 As	1.125	1.125	ppb	9.41	1000.	
82 Se	0.2584	0.2584	ppb	29.73	1000.	
88 Sr	18.85	18.85	ppb	1.06	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.2291	0.2291	ppb	11.97	1000.	
107 Ag	0.0074	0.0074	ppb	51.83	500.	
109 Ag	0.0074	0.0074	ppb	41.62	#VALUE!	
111 Cd	-0.2033	-0.2033	ppb	7.89	#VALUE!	
114 Cd	0.0437	0.0437	ppb	10.34	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.4258	0.4258	ppb	13.77	1000.	
120 Sn	0.4266	0.4266	ppb	15.45	#VALUE!	
121 Sb	0.0863	0.0863	ppb	24.19	#VALUE!	
123 Sb	0.0724	0.0724	ppb	13.34	1000.	
135 Ba	5.733	5.733	ppb	2.36	1000.	
137 Ba	5.699	5.699	ppb	1.39	#VALUE!	
182 W	0.1136	0.1136	ppb ---		#VALUE!	
203 Tl	0.0303	0.0303	ppb	42.55	1000.	
205 Tl	0.0259	0.0259	ppb	13.96	#VALUE!	
208 Pb	2.484	2.484	ppb	2.61	1000.	
232 Th	0.1151	0.1151	ppb	0.81	1000.	
238 U	0.0693	0.0693	ppb	3.55	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2593822.80	1.94	2737811.30	94.7	69.5 - 130	
45 Sc	1943902.60	1.18	2016878.10	96.4	69.5 - 130	
72 Ge	404318.53	0.94	420175.84	96.2	69.5 - 130	
159 Tb	3868056.50	1.45	3819393.30	101.3	69.5 - 130	
209 Bi	2415251.80	0.87	2381090.80	101.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000206

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\039SMPL.D\039SMPL.D#
Date Acquired: Jul 28 2014 01:58 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5495-002
Misc Info:
Vial Number: 2109
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0701	0.0701	ppb	9.42	100.	
11 B	81.62	81.62	ppb	2.04	1000.	
23 Na	92,710.	92,710.	ppb	0.66	200000.	
25 Mg	7,513.	7,513.	ppb	0.99	200000.	
27 Al	401.4	401.4	ppb	2.06	200000.	
28 Si	4,422.	4,422.	ppb	3.28	#VALUE!	
29 Si	4,569.	4,569.	ppb	8.86	10000.	
39 K	6,483.	6,483.	ppb	0.25	200000.	
43 Ca	40,090.	40,090.	ppb	1.05	#VALUE!	
44 Ca	38,480.	38,480.	ppb	1.00	200000.	
51 V	0.9213	0.9213	ppb	4.79	1000.	
52 Cr	1.4	1.4	ppb	2.92	1000.	
53 Cr	0.8169	0.8169	ppb	42.20	#VALUE!	
55 Mn	248.4	248.4	ppb	1.22	1000.	
56 Fe	1,299.	1,299.	ppb	0.92	#VALUE!	
57 Fe	1,376.	1,376.	ppb	0.24	100000.	
59 Co	0.6243	0.6243	ppb	2.21	1000.	
60 Ni	2.316	2.316	ppb	3.41	1000.	
63 Cu	26.44	26.44	ppb	1.16	#VALUE!	
65 Cu	25.74	25.74	ppb	0.55	1000.	
66 Zn	49.39	49.39	ppb	2.00	1000.	
68 Zn	47.93	47.93	ppb	1.06	#VALUE!	
75 As	1.894	1.894	ppb	1.08	1000.	
82 Se	0.7412	0.7412	ppb	42.51	1000.	
88 Sr	250.6	250.6	ppb	1.60	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	1.004	1.004	ppb	2.54	1000.	
107 Ag	0.1244	0.1244	ppb	4.16	500.	
109 Ag	0.1094	0.1094	ppb	3.91	#VALUE!	
111 Cd	-0.0829	-0.0829	ppb	13.72	#VALUE!	
114 Cd	0.1798	0.1798	ppb	9.12	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.9136	0.9136	ppb	2.71	1000.	
120 Sn	0.9334	0.9334	ppb	1.58	#VALUE!	
121 Sb	0.2959	0.2959	ppb	4.64	#VALUE!	
123 Sb	0.2824	0.2824	ppb	8.90	1000.	
135 Ba	17.02	17.02	ppb	1.86	1000.	
137 Ba	17.01	17.01	ppb	2.40	#VALUE!	
182 W	0.1408	0.1408	ppb ---		#VALUE!	
203 Tl	0.0106	0.0106	ppb	29.47	1000.	
205 Tl	0.0104	0.0104	ppb	26.05	#VALUE!	
208 Pb	14.58	14.58	ppb	0.71	1000.	
232 Th	0.0349	0.0349	ppb	13.84	1000.	
238 U	0.8797	0.8797	ppb	1.05	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2451041.80	1.39	2737811.30	89.5	69.5 - 130	
45 Sc	1911662.60	1.07	2016878.10	94.8	69.5 - 130	
72 Ge	401273.19	1.37	420175.84	95.5	69.5 - 130	
159 Tb	3755791.50	1.39	3819393.30	98.3	69.5 - 130	
209 Bi	2275607.30	0.67	2381090.80	95.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000207

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\040SMPL.D\040SMPL.D#
Date Acquired: Jul 28 2014 02:01 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5553-001
Misc Info:
Vial Number: 2110
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.018	0.018	ppb	23.15	100.	
11 B	5.893	5.893	ppb	3.15	1000.	
23 Na	30,510.	30,510.	ppb	3.07	200000.	
25 Mg	5,925.	5,925.	ppb	2.20	200000.	
27 Al	33.88	33.88	ppb	3.32	200000.	
28 Si	5,498.	5,498.	ppb	2.73	#VALUE!	
29 Si	5,970.	5,970.	ppb	6.03	10000.	
39 K	2,343.	2,343.	ppb	2.28	200000.	
43 Ca	45,530.	45,530.	ppb	2.57	#VALUE!	
44 Ca	43,780.	43,780.	ppb	1.62	200000.	
51 V	1.869	1.869	ppb	2.34	1000.	
52 Cr	1.208	1.208	ppb	3.24	1000.	
53 Cr	1.137	1.137	ppb	34.36	#VALUE!	
55 Mn	38.65	38.65	ppb	0.79	1000.	
56 Fe	2,094.	2,094.	ppb	0.78	#VALUE!	
57 Fe	2,196.	2,196.	ppb	1.41	100000.	
59 Co	0.1224	0.1224	ppb	2.45	1000.	
60 Ni	0.1871	0.1871	ppb	30.49	1000.	
63 Cu	3.61	3.61	ppb	5.02	#VALUE!	
65 Cu	3.432	3.432	ppb	1.53	1000.	
66 Zn	5.629	5.629	ppb	2.54	1000.	
68 Zn	4.579	4.579	ppb	3.54	#VALUE!	
75 As	0.5371	0.5371	ppb	38.17	1000.	
82 Se	0.3316	0.3316	ppb	45.54	1000.	
88 Sr	413.4	413.4	ppb	1.39	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.138	3.138	ppb	2.03	1000.	
107 Ag	0.0312	0.0312	ppb	10.31	500.	
109 Ag	0.0315	0.0315	ppb	27.19	#VALUE!	
111 Cd	-0.1999	-0.1999	ppb	19.85	#VALUE!	
114 Cd	0.0137	0.0137	ppb	21.26	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.7811	0.7811	ppb	3.86	1000.	
120 Sn	0.7795	0.7795	ppb	2.56	#VALUE!	
121 Sb	0.1018	0.1018	ppb	11.50	#VALUE!	
123 Sb	0.1018	0.1018	ppb	15.49	1000.	
135 Ba	2.366	2.366	ppb	4.56	1000.	
137 Ba	2.209	2.209	ppb	6.01	#VALUE!	
182 W	0.05	0.05	ppb ---		#VALUE!	
203 Tl	0.0039	0.0039	ppb	119.18	1000.	
205 Tl	0.005	0.005	ppb	6.94	#VALUE!	
208 Pb	0.4422	0.4422	ppb	2.75	1000.	
232 Th	0.0334	0.0334	ppb	9.05	1000.	
238 U	158.2	158.2	ppb	0.94	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2596969.50	1.94	2737811.30	94.9	69.5 - 130	
45 Sc	1984922.00	1.06	2016878.10	98.4	69.5 - 130	
72 Ge	416094.09	0.83	420175.84	99.0	69.5 - 130	
159 Tb	3854251.30	0.65	3819393.30	100.9	69.5 - 130	
209 Bi	2372763.80	0.71	2381090.80	99.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000208

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\041_CCV.D\041_CCV.D#
Date Acquired: Jul 28 2014 02:04 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	22.9	ppb	1.30	25	91.6	
11 B	25.15	ppb	2.63	25	100.6	
23 Na	4,876.	ppb	0.87	5,000	97.52	
25 Mg	4,938.	ppb	1.54	5,000	98.76	
27 Al	495.7	ppb	1.97	500	99.14	
28 Si	642.5	ppb	11.87	500	128.5	
29 Si	151.8	ppb	179.78	500	30.36	Fail
39 K	4,909.	ppb	1.13	5,000	98.18	
43 Ca	4,960.	ppb	1.10	5,000	99.2	
44 Ca	4,874.	ppb	0.07	5,000	97.48	
51 V	24.43	ppb	1.52	25	97.72	
52 Cr	24.39	ppb	1.35	25	97.56	
53 Cr	23.83	ppb	1.65	25	95.32	
55 Mn	24.5	ppb	0.95	25	98	
56 Fe	4,911.	ppb	1.37	5,000	98.22	
57 Fe	4,798.	ppb	0.97	5,000	95.96	
59 Co	24.44	ppb	0.59	25	97.76	
60 Ni	24.71	ppb	1.98	25	98.84	
63 Cu	24.33	ppb	0.73	25	97.32	
65 Cu	24.73	ppb	1.08	25	98.92	
66 Zn	24.13	ppb	0.57	25	96.52	
68 Zn	22.79	ppb	1.18	25	91.16	
75 As	24.55	ppb	0.35	25	98.2	
82 Se	25.02	ppb	4.18	25	100.08	
88 Sr	25.16	ppb	1.55	25	100.64	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.92	ppb	1.46	25	99.68	
107 Ag	25.08	ppb	0.75	25	100.32	
109 Ag	24.93	ppb	1.45	25	99.72	
111 Cd	24.74	ppb	1.67	25	98.96	
114 Cd	25.03	ppb	1.22	25	100.12	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.33	ppb	0.41	25	97.32	
120 Sn	24.34	ppb	0.82	25	97.36	
121 Sb	24.05	ppb	0.96	25	96.2	
123 Sb	24.13	ppb	1.17	25	96.52	
135 Ba	24.22	ppb	0.11	25	96.88	
137 Ba	24.09	ppb	0.47	25	96.36	
182 W	24.7	ppb	0.33	25	98.8	
203 Tl	24.83	ppb	2.21	25	99.32	
205 Tl	24.81	ppb	1.53	25	99.24	
208 Pb	24.74	ppb	1.09	25	98.96	
232 Th	24.03	ppb	1.29	25	96.12	
238 U	24.7	ppb	1.53	25	98.8	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2681008.00	2.13	2737811.30	97.9	80 - 120.4	
45 Sc	1994279.40	1.60	2016878.10	98.9	80 - 120.4	
72 Ge	417613.34	1.59	420175.84	99.4	80 - 120.4	
159 Tb	3925700.00	0.89	3819393.30	102.8	80 - 120.4	
209 Bi	2410552.50	1.38	2381090.80	101.2	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000209

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\042_CCB.D\042_CCB.D#
Date Acquired: Jul 28 2014 02:08 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0012	ppb	303.55	1.00	
11 B	0.5866	ppb	8.93	1.00	
23 Na	6.179	ppb	23.61	1.00	
25 Mg	0.4104	ppb	57.38	1.00	
27 Al	-0.036	ppb	191.01	1.00	
28 Si	89.55	ppb	55.58	1.00	
29 Si	-249.4	ppb	47.27	1.00	
39 K	-10.75	ppb	45.74	1.00	
43 Ca	-3.373	ppb	128.91	1.00	
44 Ca	-1.335	ppb	207.94	1.00	
51 V	0.1115	ppb	47.44	1.00	
52 Cr	-0.0256	ppb	116.03	1.00	
53 Cr	-0.0725	ppb	345.11	1.00	
55 Mn	-0.0119	ppb	92.86	1.00	
56 Fe	2.227	ppb	55.64	1.00	
57 Fe	-8.611	ppb	3.86	1.00	
59 Co	-0.0017	ppb	345.40	1.00	
60 Ni	-0.0152	ppb	83.22	1.00	
63 Cu	0.0138	ppb	58.76	1.00	
65 Cu	0.011	ppb	221.35	1.00	
66 Zn	-0.0081	ppb	349.99	1.00	
68 Zn	-1.235	ppb	13.11	1.00	
75 As	-0.0092	ppb	1134.60	1.00	
82 Se	0.108	ppb	178.61	1.00	
88 Sr	0.003	ppb	174.40	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.1069	ppb	8.93	1.00	
107 Ag	0.0028	ppb	71.64	1.00	
109 Ag	0.0029	ppb	143.28	1.00	
111 Cd	-0.1853	ppb	5.08	1.00	
114 Cd	-0.0017	ppb	266.19	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0959	ppb	24.55	1.00	
120 Sn	0.0887	ppb	11.76	1.00	
121 Sb	0.0167	ppb	37.65	1.00	
123 Sb	0.0177	ppb	43.05	1.00	
135 Ba	-0.0022	ppb	191.86	1.00	
137 Ba	0.0114	ppb	123.81	1.00	
182 W	0.1178	ppb	8.74	1.00	
203 Tl	0.0116	ppb	17.78	1.00	
205 Tl	0.0136	ppb	33.89	1.00	
208 Pb	0.0015	ppb	274.26	1.00	
232 Th	0.0702	ppb	27.19	1.00	
238 U	0.0094	ppb	63.86	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2721629.00	0.82	2737811.30	99.4	79.5 - 120	
45 Sc	1988832.30	0.60	2016878.10	98.6	79.5 - 120	
72 Ge	416317.94	1.11	420175.84	99.1	79.5 - 120	
159 Tb	3892372.50	0.45	3819393.30	101.9	79.5 - 120	
209 Bi	2446104.30	0.29	2381090.80	102.7	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000210

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\043SMPL.D\043SMPL.D#
Date Acquired: Jul 28 2014 02:11 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5461-002
Misc Info: DILUTION 1.6/8
Vial Number: 2111
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	8.15	1.63	ppb	3.15	100.	
11 B	1,595.5	319.1	ppb	2.75	1000.	
23 Na	97.4	19.48	ppb	2.62	200000.	
25 Mg	5.575	1.115	ppb	18.88	200000.	
27 Al	638.5	127.7	ppb	1.95	200000.	
28 Si	909.	181.8	ppb	35.72	#VALUE!	
29 Si	-27.41	-5.482	ppb	1135.20	10000.	
39 K	-42.095	-8.419	ppb	42.55	200000.	
43 Ca	40.41	8.082	ppb	145.38	#VALUE!	
44 Ca	15.945	3.189	ppb	102.01	200000.	
51 V	807.	161.4	ppb	0.78	1000.	
52 Cr	135.6	27.12	ppb	1.04	1000.	
53 Cr	137.2	27.44	ppb	1.23	#VALUE!	
55 Mn	757.	151.4	ppb	1.51	1000.	
56 Fe	1,657.5	331.5	ppb	1.50	#VALUE!	
57 Fe	1,413.5	282.7	ppb	1.72	100000.	
59 Co	0.0203	0.0041	ppb	258.27	1000.	
60 Ni	316.55	63.31	ppb	0.70	1000.	
63 Cu	198.6	39.72	ppb	0.43	#VALUE!	
65 Cu	201.3	40.26	ppb	0.82	1000.	
66 Zn	1,014.5	202.9	ppb	1.03	1000.	
68 Zn	1,048.	209.6	ppb	1.25	#VALUE!	
75 As	44.785	8.957	ppb	0.66	1000.	
82 Se	38.3	7.66	ppb	2.90	1000.	
88 Sr	-0.0058	-0.0012	ppb	528.88	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	72.4	14.48	ppb	1.27	1000.	
107 Ag	177.6	35.52	ppb	0.70	500.	
109 Ag	176.9	35.38	ppb	0.52	#VALUE!	
111 Cd	35.895	7.179	ppb	2.14	#VALUE!	
114 Cd	36.93	7.386	ppb	0.68	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1859	0.0372	ppb	24.25	1000.	
120 Sn	0.2103	0.0421	ppb	32.45	#VALUE!	
121 Sb	34.385	6.877	ppb	0.57	#VALUE!	
123 Sb	34.955	6.991	ppb	1.97	1000.	
135 Ba	2,371.	474.2	ppb	0.60	1000.	
137 Ba	2,383.5	476.7	ppb	1.06	#VALUE!	
182 W	0.1833	0.0367	ppb ---		#VALUE!	
203 Tl	5.1	1.02	ppb	1.23	1000.	
205 Tl	4.9335	0.9867	ppb	3.72	#VALUE!	
208 Pb	30.1	6.02	ppb	1.14	1000.	
232 Th	0.3839	0.0768	ppb	16.50	1000.	
238 U	0.0169	0.0034	ppb	28.07	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2696723.00	1.74	2737811.30	98.5	69.5 - 130	
45 Sc	1952272.60	0.45	2016878.10	96.8	69.5 - 130	
72 Ge	406972.34	0.85	420175.84	96.9	69.5 - 130	
159 Tb	3855437.50	0.14	3819393.30	100.9	69.5 - 130	
209 Bi	2418829.80	0.42	2381090.80	101.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000211

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\044SMPL.D\044SMPL.D#
Date Acquired: Jul 28 2014 02:14 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5461-005
Misc Info: DILUTION 1.6/8
Vial Number: 2112
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0039	0.0008	ppb	54.42	100.	
11 B	22.675	4.535	ppb	16.74	1000.	
23 Na	32,605.	6,521.	ppb	1.47	200000.	
25 Mg	10,850.	2,170.	ppb	1.42	200000.	
27 Al	6.515	1.303	ppb	5.97	200000.	
28 Si	129.85	25.97	ppb	304.70	#VALUE!	
29 Si	-969.5	-193.9	ppb	85.66	10000.	LOW
39 K	11,705.	2,341.	ppb	1.72	200000.	
43 Ca	32,000.	6,400.	ppb	2.08	#VALUE!	
44 Ca	32,480.	6,496.	ppb	1.39	200000.	
51 V	0.4199	0.084	ppb	75.08	1000.	
52 Cr	0.0784	0.0157	ppb	126.91	1000.	
53 Cr	1.043	0.2086	ppb	161.84	#VALUE!	
55 Mn	0.1594	0.0319	ppb	47.74	1000.	
56 Fe	16.13	3.226	ppb	48.45	#VALUE!	
57 Fe	62.75	12.55	ppb	42.41	100000.	
59 Co	0.0395	0.0079	ppb	94.93	1000.	
60 Ni	0.5835	0.1167	ppb	15.84	1000.	
63 Cu	0.5375	0.1075	ppb	9.79	#VALUE!	
65 Cu	0.3337	0.0667	ppb	33.57	1000.	
66 Zn	1.727	0.3454	ppb	16.12	1000.	
68 Zn	-4.486	-0.8972	ppb	10.41	#VALUE!	
75 As	-0.303	-0.0606	ppb	253.63	1000.	
82 Se	-0.2192	-0.0438	ppb	514.03	1000.	
88 Sr	11.78	2.356	ppb	2.40	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.3679	0.0736	ppb	7.12	1000.	
107 Ag	0.0376	0.0075	ppb	17.07	500.	
109 Ag	0.0219	0.0044	ppb	51.95	#VALUE!	
111 Cd	-0.735	-0.147	ppb	6.58	#VALUE!	
114 Cd	-0.0054	-0.0011	ppb	281.26	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1554	0.0311	ppb	31.08	1000.	
120 Sn	0.1101	0.022	ppb	48.91	#VALUE!	
121 Sb	0.0433	0.0087	ppb	115.77	#VALUE!	
123 Sb	0.047	0.0094	ppb	78.32	1000.	
135 Ba	10.295	2.059	ppb	3.06	1000.	
137 Ba	10.34	2.068	ppb	4.91	#VALUE!	
182 W	0.1276	0.0255	ppb ---		#VALUE!	
203 Tl	0.0115	0.0023	ppb	244.22	1000.	
205 Tl	0.022	0.0044	ppb	37.69	#VALUE!	
208 Pb	0.0429	0.0086	ppb	70.58	1000.	
232 Th	0.1082	0.0216	ppb	15.11	1000.	
238 U	0.0152	0.003	ppb	44.16	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2651643.50	1.51	2737811.30	96.9	69.5 - 130	
45 Sc	1968938.10	0.53	2016878.10	97.6	69.5 - 130	
72 Ge	408711.19	0.74	420175.84	97.3	69.5 - 130	
159 Tb	3849091.30	0.58	3819393.30	100.8	69.5 - 130	
209 Bi	2407803.00	0.59	2381090.80	101.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000212

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\045SMPL.D\045SMPL.D#
Date Acquired: Jul 28 2014 02:18 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5461-014
Misc Info: DILUTION 1.6/8
Vial Number: 2201
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	-0.0013	-0.0003	ppb	691.43	100.	
11 B	8.835	1.767	ppb	5.56	1000.	
23 Na	12,475.	2,495.	ppb	0.77	200000.	
25 Mg	6.885	1.377	ppb	14.66	200000.	
27 Al	8.78	1.756	ppb	0.19	200000.	
28 Si	7,060.	1,412.	ppb	3.35	#VALUE!	
29 Si	6,410.	1,282.	ppb	13.36	10000.	
39 K	-51.75	-10.35	ppb	28.96	200000.	
43 Ca	20.965	4.193	ppb	119.29	#VALUE!	
44 Ca	33.05	6.61	ppb	7.45	200000.	
51 V	0.2794	0.0559	ppb	144.71	1000.	
52 Cr	0.1515	0.0303	ppb	36.80	1000.	
53 Cr	3.2995	0.6599	ppb	20.84	#VALUE!	
55 Mn	0.1325	0.0265	ppb	25.40	1000.	
56 Fe	3.038	0.6076	ppb	90.82	#VALUE!	
57 Fe	-90.25	-18.05	ppb	24.60	100000.	
59 Co	-0.0194	-0.0039	ppb	150.26	1000.	
60 Ni	0.0713	0.0143	ppb	202.53	1000.	
63 Cu	0.3248	0.065	ppb	22.93	#VALUE!	
65 Cu	0.4219	0.0844	ppb	24.75	1000.	
66 Zn	1.731	0.3462	ppb	11.78	1000.	
68 Zn	-4.621	-0.9242	ppb	21.64	#VALUE!	
75 As	0.1866	0.0373	ppb	336.64	1000.	
82 Se	0.88	0.176	ppb	90.00	1000.	
88 Sr	0.09	0.018	ppb	34.31	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	0.2175	0.0435	ppb	31.10	1000.	
107 Ag	0.0212	0.0042	ppb	103.25	500.	
109 Ag	0.0224	0.0045	ppb	113.00	#VALUE!	
111 Cd	-1.074	-0.2148	ppb	25.86	#VALUE!	
114 Cd	0.001	0.0002	ppb	1235.60	1000.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	0.1457	0.0291	ppb	63.03	1000.	
120 Sn	0.1265	0.0253	ppb	13.99	#VALUE!	
121 Sb	0.0042	0.0008	ppb	534.15	#VALUE!	
123 Sb	0.0173	0.0035	ppb	160.25	1000.	
135 Ba	0.7695	0.1539	ppb	20.10	1000.	
137 Ba	0.6785	0.1357	ppb	12.32	#VALUE!	
182 W	0.1207	0.0241	ppb	---	#VALUE!	
203 Tl	0.0067	0.0013	ppb	117.24	1000.	
205 Tl	-0.0006	-0.0001	ppb	1718.30	#VALUE!	
208 Pb	0.0375	0.0075	ppb	33.71	1000.	
232 Th	0.0312	0.0062	ppb	58.56	1000.	
238 U	0.0134	0.0027	ppb	79.21	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2709473.00	2.26	2737811.30	99.0	69.5 - 130	
45 Sc	1992363.10	0.71	2016878.10	98.8	69.5 - 130	
72 Ge	415691.78	0.76	420175.84	98.9	69.5 - 130	
159 Tb	3921331.50	0.13	3819393.30	102.7	69.5 - 130	
209 Bi	2474907.30	0.84	2381090.80	103.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000213

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\046SMPL.D\046SMPL.D#
Date Acquired: Jul 28 2014 02:21 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5461-015
Misc Info: DILUTION 1.6/8
Vial Number: 2202
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0039	0.0008	ppb	277.59	100.	
11 B	27.475	5.495	ppb	2.88	1000.	
23 Na	65.35	13.07	ppb	6.23	200000.	
25 Mg	6.01	1.202	ppb	4.93	200000.	
27 Al	7.335	1.467	ppb	11.56	200000.	
28 Si	452.95	90.59	ppb	187.99	#VALUE!	
29 Si	-1,721.5	-344.3	ppb	117.02	10000.	LOW
39 K	-31.21	-6.242	ppb	107.85	200000.	
43 Ca	7.61	1.522	ppb	270.89	#VALUE!	
44 Ca	5.505	1.101	ppb	552.32	200000.	
51 V	0.3436	0.0687	ppb	228.90	1000.	
52 Cr	0.1244	0.0249	ppb	69.70	1000.	
53 Cr	2.9565	0.5913	ppb	55.35	#VALUE!	
55 Mn	0.2171	0.0434	ppb	47.75	1000.	
56 Fe	14.685	2.937	ppb	19.20	#VALUE!	
57 Fe	-43.915	-8.783	ppb	52.08	100000.	
59 Co	-0.0081	-0.0016	ppb	106.25	1000.	
60 Ni	-0.0044	-0.0009	ppb	1582.70	1000.	
63 Cu	0.3367	0.0673	ppb	14.00	#VALUE!	
65 Cu	0.4766	0.0953	ppb	12.14	1000.	
66 Zn	1.4065	0.2813	ppb	28.01	1000.	
68 Zn	-4.223	-0.8446	ppb	23.48	#VALUE!	
75 As	0.5425	0.1085	ppb	28.01	1000.	
82 Se	0.26	0.052	ppb	498.56	1000.	
88 Sr	-0.0046	-0.0009	ppb	496.64	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.1436	0.0287	ppb	34.60	1000.	
107 Ag	0.021	0.0042	ppb	52.56	500.	
109 Ag	0.0202	0.004	ppb	102.97	#VALUE!	
111 Cd	-0.7575	-0.1515	ppb	12.46	#VALUE!	
114 Cd	0.0195	0.0039	ppb	63.05	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	2.395	0.479	ppb	6.75	1000.	
120 Sn	2.489	0.4978	ppb	4.64	#VALUE!	
121 Sb	0.0143	0.0029	ppb	123.75	#VALUE!	
123 Sb	0.0148	0.003	ppb	65.51	1000.	
135 Ba	0.1227	0.0245	ppb	53.55	1000.	
137 Ba	0.1475	0.0295	ppb	44.63	#VALUE!	
182 W	0.0892	0.0178	ppb ---		#VALUE!	
203 Tl	0.0077	0.0015	ppb	155.28	1000.	
205 Tl	0.0111	0.0022	ppb	58.88	#VALUE!	
208 Pb	0.0684	0.0137	ppb	7.96	1000.	
232 Th	0.0352	0.007	ppb	52.73	1000.	
238 U	48.21	9.642	ppb	0.94	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2657971.30	0.24	2737811.30	97.1	69.5 - 130	
45 Sc	1973920.60	1.78	2016878.10	97.9	69.5 - 130	
72 Ge	410885.53	1.53	420175.84	97.8	69.5 - 130	
159 Tb	3862607.80	0.82	3819393.30	101.1	69.5 - 130	
209 Bi	2424366.50	1.76	2381090.80	101.8	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000214

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\047SMPL.D\047SMPL.D#
Date Acquired: Jul 28 2014 02:24 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5581-001
Misc Info:
Vial Number: 2203
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	0.0046	0.0046	ppb	90.16	100.	
11 B	3,244.	3,244.	ppb	2.06	1000.	>LDR
23 Na	----	--------	ppb	--------	200000.	>LDR
25 Mg	912,800.	912,800.	ppb	0.43	200000.	>LDR
27 Al	38.56	38.56	ppb	1.52	200000.	
28 Si	1,021.	1,021.	ppb	21.00	#VALUE!	
29 Si	673.1	673.1	ppb	2.15	10000.	
39 K	296,000.	296,000.	ppb	1.06	200000.	>LDR
43 Ca	316,200.	316,200.	ppb	0.83	#VALUE!	
44 Ca	300,900.	300,900.	ppb	1.15	200000.	>LDR
51 V	1.33	1.33	ppb	3.23	1000.	
52 Cr	1.191	1.191	ppb	6.27	1000.	
53 Cr	18.28	18.28	ppb	6.33	#VALUE!	
55 Mn	6.082	6.082	ppb	2.12	1000.	
56 Fe	138.3	138.3	ppb	9.35	#VALUE!	
57 Fe	1,173.	1,173.	ppb	2.83	100000.	
59 Co	0.6362	0.6362	ppb	2.61	1000.	
60 Ni	3.783	3.783	ppb	5.38	1000.	
63 Cu	94.28	94.28	ppb	3.50	#VALUE!	
65 Cu	1.353	1.353	ppb	9.58	1000.	
66 Zn	8.45	8.45	ppb	5.93	1000.	
68 Zn	-1.574	-1.574	ppb	16.41	#VALUE!	
75 As	16.86	16.86	ppb	6.51	1000.	
82 Se	68.6	68.6	ppb	1.52	1000.	
88 Sr	5,665.	5,665.	ppb	1.69	1000.	>LDR
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	8.642	8.642	ppb	3.84	1000.	
107 Ag	0.0221	0.0221	ppb	5.57	500.	
109 Ag	0.0199	0.0199	ppb	19.22	#VALUE!	
111 Cd	-0.1352	-0.1352	ppb	45.64	#VALUE!	
114 Cd	0.0467	0.0467	ppb	6.37	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.1341	0.1341	ppb	9.63	1000.	
120 Sn	0.1315	0.1315	ppb	9.00	#VALUE!	
121 Sb	0.1895	0.1895	ppb	16.94	#VALUE!	
123 Sb	0.2096	0.2096	ppb	14.51	1000.	
135 Ba	6.564	6.564	ppb	4.09	1000.	
137 Ba	6.474	6.474	ppb	1.86	#VALUE!	
182 W	0.0625	0.0625	ppb ---		#VALUE!	
203 Tl	0.0205	0.0205	ppb	10.66	1000.	
205 Tl	0.0219	0.0219	ppb	23.51	#VALUE!	
208 Pb	0.2459	0.2459	ppb	4.55	1000.	
232 Th	0.2083	0.2083	ppb	29.95	1000.	
238 U	2.921	2.921	ppb	0.64	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2235470.50	0.89	2737811.30	81.7	69.5 - 130	
45 Sc	1947286.60	2.43	2016878.10	96.5	69.5 - 130	
72 Ge	386818.22	1.71	420175.84	92.1	69.5 - 130	
159 Tb	3426580.30	0.53	3819393.30	89.7	69.5 - 130	
209 Bi	1812785.40	1.69	2381090.80	76.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

6 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000215

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\048SMPL.D\048SMPL.D#
Date Acquired: Jul 28 2014 02:28 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH5588-001
Misc Info:
Vial Number: 2204
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 1.00
Autodil Factor: Undiluted
Final Dil Factor: 1.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	-0.0004	-0.0004	ppb	215.03	100.	
11 B	21.07	21.07	ppb	16.76	1000.	
23 Na	90,250.	90,250.	ppb	1.65	200000.	
25 Mg	150.3	150.3	ppb	3.09	200000.	
27 Al	740.	740.	ppb	1.14	200000.	
28 Si	872.4	872.4	ppb	17.85	#VALUE!	
29 Si	-375.7	-375.7	ppb	70.24	10000.	LOW
39 K	23,840.	23,840.	ppb	0.90	200000.	
43 Ca	441.4	441.4	ppb	0.91	#VALUE!	
44 Ca	428.4	428.4	ppb	1.14	200000.	
51 V	0.5819	0.5819	ppb	8.27	1000.	
52 Cr	15.92	15.92	ppb	0.87	1000.	
53 Cr	12.7	12.7	ppb	1.91	#VALUE!	
55 Mn	15.53	15.53	ppb	0.94	1000.	
56 Fe	1,868.	1,868.	ppb	0.61	#VALUE!	
57 Fe	1,792.	1,792.	ppb	1.19	100000.	
59 Co	0.5925	0.5925	ppb	3.04	1000.	
60 Ni	12.6	12.6	ppb	1.85	1000.	
63 Cu	42.49	42.49	ppb	0.81	#VALUE!	
65 Cu	41.12	41.12	ppb	1.05	1000.	
66 Zn	34.58	34.58	ppb	0.73	1000.	
68 Zn	32.12	32.12	ppb	1.02	#VALUE!	
75 As	0.7366	0.7366	ppb	34.33	1000.	
82 Se	0.0523	0.0523	ppb	83.88	1000.	
88 Sr	1.727	1.727	ppb	2.31	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	0.7493	0.7493	ppb	2.00	1000.	
107 Ag	0.1273	0.1273	ppb	14.01	500.	
109 Ag	0.1338	0.1338	ppb	1.81	#VALUE!	
111 Cd	-0.2175	-0.2175	ppb	30.06	#VALUE!	
114 Cd	0.0143	0.0143	ppb	71.87	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	0.5426	0.5426	ppb	7.80	1000.	
120 Sn	0.5184	0.5184	ppb	4.59	#VALUE!	
121 Sb	0.5578	0.5578	ppb	4.31	#VALUE!	
123 Sb	0.5323	0.5323	ppb	7.25	1000.	
135 Ba	1.11	1.11	ppb	3.10	1000.	
137 Ba	1.09	1.09	ppb	5.63	#VALUE!	
182 W	0.341	0.341	ppb ---		#VALUE!	
203 Tl	0.0046	0.0046	ppb	99.50	1000.	
205 Tl	0.0019	0.0019	ppb	48.43	#VALUE!	
208 Pb	0.4685	0.4685	ppb	2.14	1000.	
232 Th	0.0437	0.0437	ppb	4.94	1000.	
238 U	0.0111	0.0111	ppb	22.79	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2485657.00	1.88	2737811.30	90.8	69.5 - 130	
45 Sc	2098033.00	2.02	2016878.10	104.0	69.5 - 130	
72 Ge	435839.19	1.91	420175.84	103.7	69.5 - 130	
159 Tb	3879250.80	0.93	3819393.30	101.6	69.5 - 130	
209 Bi	2326580.00	1.67	2381090.80	97.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000216

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\049SMPL.D\049SMPL.D#
Date Acquired: Jul 28 2014 02:31 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: PBSHG15IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 2205
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	-0.001	-0.0002	ppb	1467.70	100.	
11 B	37.94	7.588	ppb	11.31	1000.	
23 Na	4,182.	836.4	ppb	2.91	200000.	
25 Mg	53.45	10.69	ppb	7.45	200000.	
27 Al	9.96	1.992	ppb	7.00	200000.	
28 Si	2,521.5	504.3	ppb	9.79	#VALUE!	
29 Si	-1,510.	-302.	ppb	45.80	10000.	LOW
39 K	95.35	19.07	ppb	18.57	200000.	
43 Ca	121.85	24.37	ppb	39.84	#VALUE!	
44 Ca	75.2	15.04	ppb	10.02	200000.	
51 V	0.8215	0.1643	ppb	56.70	1000.	
52 Cr	2.0685	0.4137	ppb	3.92	1000.	
53 Cr	44.25	8.85	ppb	13.01	#VALUE!	
55 Mn	0.3333	0.0667	ppb	17.45	1000.	
56 Fe	199.75	39.95	ppb	4.29	#VALUE!	
57 Fe	-25.645	-5.129	ppb	86.37	100000.	
59 Co	-0.0312	-0.0062	ppb	24.49	1000.	
60 Ni	3.146	0.6292	ppb	8.85	1000.	
63 Cu	5.765	1.153	ppb	6.44	#VALUE!	
65 Cu	1.717	0.3434	ppb	2.06	1000.	
66 Zn	2.019	0.4038	ppb	16.59	1000.	
68 Zn	-8.855	-1.771	ppb	18.76	#VALUE!	
75 As	2.7225	0.5445	ppb	28.23	1000.	
82 Se	2.258	0.4516	ppb	46.01	1000.	
88 Sr	0.181	0.0362	ppb	35.09	1000.	
89 Y	----	--------	---	---	#VALUE!	
98 Mo	0.1815	0.0363	ppb	21.90	1000.	
107 Ag	0.0132	0.0026	ppb	184.23	500.	
109 Ag	0.01	0.002	ppb	76.66	#VALUE!	
111 Cd	-0.8325	-0.1665	ppb	8.59	#VALUE!	
114 Cd	-0.0224	-0.0045	ppb	270.63	1000.	
115 In	----	--------	---	---	#VALUE!	
118 Sn	21.35	4.27	ppb	1.69	1000.	
120 Sn	21.345	4.269	ppb	1.33	#VALUE!	
121 Sb	0.0335	0.0067	ppb	39.06	#VALUE!	
123 Sb	0.0369	0.0074	ppb	33.50	1000.	
135 Ba	0.3349	0.067	ppb	32.61	1000.	
137 Ba	0.3249	0.065	ppb	39.20	#VALUE!	
182 W	0.0805	0.0161	ppb	---	#VALUE!	
203 Tl	0.0087	0.0017	ppb	207.90	1000.	
205 Tl	0.0098	0.002	ppb	103.77	#VALUE!	
208 Pb	0.3416	0.0683	ppb	7.64	1000.	
232 Th	0.1134	0.0227	ppb	20.69	1000.	
238 U	0.0132	0.0026	ppb	42.73	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2615150.80	0.39	2737811.30	95.5	69.5 - 130	
45 Sc	2092717.30	0.32	2016878.10	103.8	69.5 - 130	
72 Ge	435457.69	0.64	420175.84	103.6	69.5 - 130	
159 Tb	3986747.00	0.73	3819393.30	104.4	69.5 - 130	
209 Bi	2463696.00	0.71	2381090.80	103.5	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000217

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\050SMPL.D\050SMPL.D#
Date Acquired: Jul 28 2014 02:35 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: LCSOHG15IMS1
Misc Info: DILUTION 1.6/8
Vial Number: 2206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	46.355	9.271	ppb	2.18	100.	
11 B	463.2	92.64	ppb	1.80	1000.	
23 Na	10,580.	2,116.	ppb	0.59	200000.	
25 Mg	4,846.5	969.3	ppb	0.80	200000.	
27 Al	1,989.	397.8	ppb	1.12	200000.	
28 Si	3,745.	749.	ppb	7.51	#VALUE!	
29 Si	651.	130.2	ppb	144.70	10000.	
39 K	9,680.	1,936.	ppb	0.56	200000.	
43 Ca	2,630.	526.	ppb	3.81	#VALUE!	
44 Ca	2,112.	422.4	ppb	1.76	200000.	
51 V	471.8	94.36	ppb	1.37	1000.	
52 Cr	193.65	38.73	ppb	2.10	1000.	
53 Cr	244.55	48.91	ppb	3.27	#VALUE!	
55 Mn	487.15	97.43	ppb	2.05	1000.	
56 Fe	1,145.5	229.1	ppb	1.86	#VALUE!	
57 Fe	936.	187.2	ppb	1.77	100000.	
59 Co	488.4	97.68	ppb	1.13	1000.	
60 Ni	494.9	98.98	ppb	1.26	1000.	
63 Cu	277.1	55.42	ppb	1.38	#VALUE!	
65 Cu	276.05	55.21	ppb	1.81	1000.	
66 Zn	482.15	96.43	ppb	1.08	1000.	
68 Zn	511.	102.2	ppb	1.16	#VALUE!	
75 As	100.1	20.02	ppb	2.06	1000.	
82 Se	100.45	20.09	ppb	2.31	1000.	
88 Sr	476.55	95.31	ppb	1.86	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	280.15	56.03	ppb	1.96	1000.	
107 Ag	49.085	9.817	ppb	1.49	500.	
109 Ag	48.73	9.746	ppb	1.91	#VALUE!	
111 Cd	230.65	46.13	ppb	1.50	#VALUE!	
114 Cd	232.3	46.46	ppb	1.86	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	480.6	96.12	ppb	1.49	1000.	
120 Sn	481.7	96.34	ppb	1.19	#VALUE!	
121 Sb	94.7	18.94	ppb	0.66	#VALUE!	
123 Sb	94.9	18.98	ppb	0.94	1000.	
135 Ba	1,894.	378.8	ppb	1.26	1000.	
137 Ba	1,894.	378.8	ppb	1.47	#VALUE!	
182 W	91.2	18.24	ppb ---		#VALUE!	
203 Tl	99.35	19.87	ppb	1.21	1000.	
205 Tl	97.85	19.57	ppb	0.46	#VALUE!	
208 Pb	100.45	20.09	ppb	1.21	1000.	
232 Th	0.2332	0.0466	ppb	13.95	1000.	
238 U	96.4	19.28	ppb	0.67	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2723153.30	1.58	2737811.30	99.5	69.5 - 130	
45 Sc	2082251.40	1.54	2016878.10	103.2	69.5 - 130	
72 Ge	431160.66	2.30	420175.84	102.6	69.5 - 130	
159 Tb	4021860.00	1.64	3819393.30	105.3	69.5 - 130	
209 Bi	2497980.80	0.22	2381090.80	104.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000218

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\051SMPL.D\051SMPL.D#
Date Acquired: Jul 28 2014 02:38 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-001
Misc Info: DILUTION 1.6/8
Vial Number: 2207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.795	1.159	ppb	0.60	100.	
11 B	64.3	12.86	ppb	5.48	1000.	
23 Na	12,515.	2,503.	ppb	1.94	200000.	
25 Mg	102,750.	20,550.	ppb	0.92	200000.	
27 Al	375,750.	75,150.	ppb	1.72	200000.	
28 Si	-1,685.5	-337.1	ppb	20.63	#VALUE!	
29 Si	-18,795.	-3,759.	ppb	2.86	10000.	LOW
39 K	43,515.	8,703.	ppb	1.19	200000.	
43 Ca	96,750.	19,350.	ppb	0.95	#VALUE!	
44 Ca	93,600.	18,720.	ppb	0.91	200000.	
51 V	3,248.	649.6	ppb	1.23	1000.	
52 Cr	384.45	76.89	ppb	0.90	1000.	
53 Cr	402.4	80.48	ppb	1.36	#VALUE!	
55 Mn	12,100.	2,420.	ppb	0.47	1000.	>LDR
56 Fe	869,000.	173,800.	ppb	0.51	#VALUE!	
57 Fe	822,500.	164,500.	ppb	0.51	100000.	>LDR
59 Co	345.05	69.01	ppb	0.77	1000.	
60 Ni	154.55	30.91	ppb	0.41	1000.	
63 Cu	1,854.	370.8	ppb	0.51	#VALUE!	
65 Cu	1,936.5	387.3	ppb	0.42	1000.	
66 Zn	1,428.5	285.7	ppb	0.17	1000.	
68 Zn	1,433.5	286.7	ppb	0.42	#VALUE!	
75 As	9.84	1.968	ppb	8.18	1000.	
82 Se	20.625	4.125	ppb	2.71	1000.	
88 Sr	828.	165.6	ppb	0.65	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	7.66	1.532	ppb	2.11	1000.	
107 Ag	0.253	0.0506	ppb	13.46	500.	
109 Ag	0.2546	0.0509	ppb	16.86	#VALUE!	
111 Cd	1.1255	0.2251	ppb	30.00	#VALUE!	
114 Cd	0.7715	0.1543	ppb	4.69	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.08	5.016	ppb	1.39	1000.	
120 Sn	25.425	5.085	ppb	1.10	#VALUE!	
121 Sb	0.517	0.1034	ppb	1.16	#VALUE!	
123 Sb	0.519	0.1038	ppb	13.64	1000.	
135 Ba	1,922.5	384.5	ppb	0.51	1000.	
137 Ba	1,933.	386.6	ppb	0.29	#VALUE!	
182 W	0.7665	0.1533	ppb ---		#VALUE!	
203 Tl	9.41	1.882	ppb	4.45	1000.	
205 Tl	9.465	1.893	ppb	1.87	#VALUE!	
208 Pb	106.45	21.29	ppb	0.18	1000.	
232 Th	5.12	1.024	ppb	5.89	1000.	
238 U	5.415	1.083	ppb	1.62	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2674967.30	0.95	2737811.30	97.7	69.5 - 130	
45 Sc	2710881.00	0.60	2016878.10	134.4	69.5 - 130	IS Fai
72 Ge	455611.78	0.27	420175.84	108.4	69.5 - 130	
159 Tb	4005576.30	0.29	3819393.30	104.9	69.5 - 130	
209 Bi	2361538.80	0.23	2381090.80	99.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
1 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Fail

Katahdin Analytical Services 4000219

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\052SMPL.D\052SMPL.D#
Date Acquired: Jul 28 2014 02:41 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-002
Misc Info: DILUTION 1.6/8
Vial Number: 2208
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.715	1.143	ppb	2.19	100.	
11 B	65.3	13.06	ppb	1.83	1000.	
23 Na	15,030.	3,006.	ppb	1.79	200000.	
25 Mg	100,300.	20,060.	ppb	0.23	200000.	
27 Al	417,750.	83,550.	ppb	0.21	200000.	
28 Si	-1,881.	-376.2	ppb	13.34	#VALUE!	
29 Si	-17,805.	-3,561.	ppb	1.96	10000.	LOW
39 K	26,230.	5,246.	ppb	0.66	200000.	
43 Ca	61,500.	12,300.	ppb	0.72	#VALUE!	
44 Ca	60,200.	12,040.	ppb	0.31	200000.	
51 V	3,140.	628.	ppb	0.15	1000.	
52 Cr	510.5	102.1	ppb	0.24	1000.	
53 Cr	521.	104.2	ppb	0.09	#VALUE!	
55 Mn	10,390.	2,078.	ppb	0.51	1000.	>LDR
56 Fe	847,500.	169,500.	ppb	0.42	#VALUE!	
57 Fe	801,500.	160,300.	ppb	0.41	100000.	>LDR
59 Co	376.8	75.36	ppb	0.37	1000.	
60 Ni	190.75	38.15	ppb	1.38	1000.	
63 Cu	1,895.5	379.1	ppb	0.85	#VALUE!	
65 Cu	1,984.	396.8	ppb	0.54	1000.	
66 Zn	1,281.	256.2	ppb	1.37	1000.	
68 Zn	1,280.	256.	ppb	0.64	#VALUE!	
75 As	13.285	2.657	ppb	8.94	1000.	
82 Se	19.47	3.894	ppb	6.67	1000.	
88 Sr	599.	119.8	ppb	1.45	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	7.985	1.597	ppb	4.32	1000.	
107 Ag	0.3957	0.0791	ppb	4.17	500.	
109 Ag	0.3475	0.0695	ppb	12.04	#VALUE!	
111 Cd	1.0345	0.2069	ppb	21.45	#VALUE!	
114 Cd	0.613	0.1226	ppb	8.40	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.105	5.021	ppb	3.40	1000.	
120 Sn	24.99	4.998	ppb	1.42	#VALUE!	
121 Sb	0.5775	0.1155	ppb	3.14	#VALUE!	
123 Sb	0.612	0.1224	ppb	14.44	1000.	
135 Ba	1,453.5	290.7	ppb	1.08	1000.	
137 Ba	1,462.	292.4	ppb	1.11	#VALUE!	
182 W	0.5105	0.1021	ppb ---		#VALUE!	
203 Tl	6.565	1.313	ppb	3.75	1000.	
205 Tl	6.48	1.296	ppb	2.81	#VALUE!	
208 Pb	70.65	14.13	ppb	1.38	1000.	
232 Th	7.065	1.413	ppb	3.93	1000.	
238 U	5.14	1.028	ppb	1.83	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2694927.50	0.93	2737811.30	98.4	69.5 - 130	
45 Sc	2659687.00	0.31	2016878.10	131.9	69.5 - 130	IS Fai
72 Ge	452725.84	0.65	420175.84	107.7	69.5 - 130	
159 Tb	3962313.80	0.43	3819393.30	103.7	69.5 - 130	
209 Bi	2343369.00	0.71	2381090.80	98.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
1 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Fail

Katahdin Analytical Services 4000220

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\053_CCV.D\053_CCV.D#
Date Acquired: Jul 28 2014 02:45 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	23.81	ppb	2.56	25	95.24	
11 B	26.96	ppb	1.07	25	107.84	
23 Na	5,146.	ppb	0.64	5,000	102.92	
25 Mg	4,992.	ppb	0.77	5,000	99.84	
27 Al	504.5	ppb	0.52	500	100.9	
28 Si	638.3	ppb	7.90	500	127.66	
29 Si	721.3	ppb	24.59	500	144.26	Fail
39 K	4,947.	ppb	0.65	5,000	98.94	
43 Ca	4,797.	ppb	1.28	5,000	95.94	
44 Ca	4,853.	ppb	0.42	5,000	97.06	
51 V	24.66	ppb	2.34	25	98.64	
52 Cr	24.61	ppb	1.85	25	98.44	
53 Cr	20.53	ppb	1.99	25	82.12	
55 Mn	24.91	ppb	1.02	25	99.64	
56 Fe	4,953.	ppb	1.27	5,000	99.06	
57 Fe	4,851.	ppb	0.90	5,000	97.02	
59 Co	24.58	ppb	0.90	25	98.32	
60 Ni	24.63	ppb	1.83	25	98.52	
63 Cu	25.14	ppb	1.54	25	100.56	
65 Cu	25.02	ppb	0.33	25	100.08	
66 Zn	24.5	ppb	2.13	25	98	
68 Zn	21.83	ppb	1.85	25	87.32	
75 As	24.4	ppb	0.68	25	97.6	
82 Se	25.42	ppb	0.55	25	101.68	
88 Sr	25.18	ppb	0.63	25	100.72	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	24.99	ppb	1.90	25	99.96	
107 Ag	25.07	ppb	1.05	25	100.28	
109 Ag	25.02	ppb	1.54	25	100.08	
111 Cd	25.05	ppb	1.24	25	100.2	
114 Cd	25.17	ppb	1.55	25	100.68	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	24.15	ppb	0.16	25	96.6	
120 Sn	24.17	ppb	0.39	25	96.68	
121 Sb	23.95	ppb	1.88	25	95.8	
123 Sb	24.31	ppb	0.84	25	97.24	
135 Ba	23.82	ppb	0.90	25	95.28	
137 Ba	24.2	ppb	0.16	25	96.8	
182 W	24.55	ppb	1.38	25	98.2	
203 Tl	24.9	ppb	1.22	25	99.6	
205 Tl	24.81	ppb	0.50	25	99.24	
208 Pb	24.66	ppb	1.23	25	98.64	
232 Th	24.21	ppb	0.48	25	96.84	
238 U	24.67	ppb	0.81	25	98.68	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2626536.50	1.47	2737811.30	95.9	80 - 120.4	
45 Sc	2039484.80	0.99	2016878.10	101.1	80 - 120.4	
72 Ge	421682.41	1.74	420175.84	100.4	80 - 120.4	
159 Tb	3991208.80	1.03	3819393.30	104.5	80 - 120.4	
209 Bi	2487356.80	0.86	2381090.80	104.5	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000221

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\054_CCB.D\054_CCB.D#
Date Acquired: Jul 28 2014 02:48 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.0045	ppb	29.54	1.00	
11 B	1.287	ppb	6.37	1.00	
23 Na	214.9	ppb	5.60	1.00	Fail
25 Mg	1.654	ppb	43.32	1.00	
27 Al	0.5452	ppb	61.08	1.00	
28 Si	218.1	ppb	45.38	1.00	
29 Si	372.6	ppb	51.10	1.00	Fail
39 K	-4.395	ppb	71.99	1.00	
43 Ca	2.051	ppb	244.47	1.00	
44 Ca	-5.803	ppb	55.58	1.00	
51 V	-0.1295	ppb	12.52	1.00	
52 Cr	-0.0529	ppb	27.37	1.00	
53 Cr	-3.599	ppb	1.87	1.00	
55 Mn	0.0542	ppb	22.35	1.00	
56 Fe	-5.89	ppb	11.65	1.00	
57 Fe	-6.456	ppb	42.50	1.00	
59 Co	0.0028	ppb	96.06	1.00	
60 Ni	0.224	ppb	7.20	1.00	
63 Cu	0.5801	ppb	3.63	1.00	
65 Cu	0.2647	ppb	11.16	1.00	
66 Zn	0.0705	ppb	103.60	1.00	
68 Zn	-2.132	ppb	8.36	1.00	
75 As	0.2473	ppb	90.05	1.00	
82 Se	0.2701	ppb	112.51	1.00	
88 Sr	-0.0005	ppb	1282.90	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0776	ppb	12.18	1.00	
107 Ag	0.0012	ppb	199.03	1.00	
109 Ag	0.0031	ppb	87.87	1.00	
111 Cd	-0.1493	ppb	23.44	1.00	
114 Cd	0.0001	ppb	2525.90	1.00	
115 In	--------	---	--------	---	
118 Sn	0.0713	ppb	6.79	1.00	
120 Sn	0.0738	ppb	24.14	1.00	
121 Sb	0.0218	ppb	40.52	1.00	
123 Sb	0.0191	ppb	38.31	1.00	
135 Ba	0.0159	ppb	69.93	1.00	
137 Ba	0.0185	ppb	37.11	1.00	
182 W	0.1111	ppb	8.30	1.00	
203 Tl	0.012	ppb	24.46	1.00	
205 Tl	0.0137	ppb	16.60	1.00	
208 Pb	0.0103	ppb	101.64	1.00	
232 Th	0.0447	ppb	29.11	1.00	
238 U	0.0019	ppb	23.76	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2620394.80	1.06	2737811.30	95.7	79.5 - 120	
45 Sc	2022144.50	0.94	2016878.10	100.3	79.5 - 120	
72 Ge	419117.97	1.94	420175.84	99.7	79.5 - 120	
159 Tb	3968585.80	1.22	3819393.30	103.9	79.5 - 120	
209 Bi	2520431.00	2.02	2381090.80	105.9	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000222

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\055SMPL.D\055SMPL.D#
Date Acquired: Jul 28 2014 02:52 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-003
Misc Info: DILUTION 1.6/8
Vial Number: 2209
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.91	1.182	ppb	1.92	100.	
11 B	46.755	9.351	ppb	2.00	1000.	
23 Na	7,210.	1,442.	ppb	1.55	200000.	
25 Mg	73,750.	14,750.	ppb	1.21	200000.	
27 Al	351,600.	70,320.	ppb	1.09	200000.	
28 Si	-3,153.	-630.6	ppb	8.99	#VALUE!	
29 Si	-18,150.	-3,630.	ppb	4.69	10000.	LOW
39 K	24,840.	4,968.	ppb	0.89	200000.	
43 Ca	94,950.	18,990.	ppb	0.63	#VALUE!	
44 Ca	91,550.	18,310.	ppb	1.03	200000.	
51 V	3,346.5	669.3	ppb	0.56	1000.	
52 Cr	429.5	85.9	ppb	0.70	1000.	
53 Cr	443.65	88.73	ppb	1.56	#VALUE!	
55 Mn	6,175.	1,235.	ppb	0.86	1000.	>LDR
56 Fe	863,500.	172,700.	ppb	0.84	#VALUE!	
57 Fe	819,000.	163,800.	ppb	1.17	100000.	>LDR
59 Co	283.75	56.75	ppb	1.35	1000.	
60 Ni	152.45	30.49	ppb	2.13	1000.	
63 Cu	1,719.	343.8	ppb	1.18	#VALUE!	
65 Cu	1,803.	360.6	ppb	0.88	1000.	
66 Zn	1,279.5	255.9	ppb	1.12	1000.	
68 Zn	1,279.5	255.9	ppb	1.50	#VALUE!	
75 As	11.6	2.32	ppb	7.03	1000.	
82 Se	27.74	5.548	ppb	8.26	1000.	
88 Sr	635.5	127.1	ppb	1.15	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	5.09	1.018	ppb	2.22	1000.	
107 Ag	0.3105	0.0621	ppb	20.05	500.	
109 Ag	0.2974	0.0595	ppb	6.88	#VALUE!	
111 Cd	1.0555	0.2111	ppb	17.02	#VALUE!	
114 Cd	0.55	0.11	ppb	26.20	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.08	5.016	ppb	0.95	1000.	
120 Sn	24.875	4.975	ppb	0.50	#VALUE!	
121 Sb	0.573	0.1146	ppb	6.83	#VALUE!	
123 Sb	0.6275	0.1255	ppb	3.33	1000.	
135 Ba	1,162.	232.4	ppb	0.81	1000.	
137 Ba	1,175.5	235.1	ppb	0.90	#VALUE!	
182 W	0.5685	0.1137	ppb ---		#VALUE!	
203 Tl	5.625	1.125	ppb	4.37	1000.	
205 Tl	5.645	1.129	ppb	4.15	#VALUE!	
208 Pb	52.1	10.42	ppb	1.61	1000.	
232 Th	6.645	1.329	ppb	7.98	1000.	
238 U	5.02	1.004	ppb	1.88	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2680311.00	0.44	2737811.30	97.9	69.5 - 130	
45 Sc	2692689.80	1.77	2016878.10	133.5	69.5 - 130	IS Fai
72 Ge	442329.66	1.82	420175.84	105.3	69.5 - 130	
159 Tb	3943703.80	1.34	3819393.30	103.3	69.5 - 130	
209 Bi	2360392.30	1.20	2381090.80	99.1	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
1 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Fail

Katahdin Analytical Services 4000223

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\056SMPL.D\056SMPL.D#
Date Acquired: Jul 28 2014 02:55 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-004
Misc Info: DILUTION 1.6/8
Vial Number: 2210
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.79	0.758	ppb	3.09	100.	
11 B	48.355	9.671	ppb	2.51	1000.	
23 Na	10,535.	2,107.	ppb	1.08	200000.	
25 Mg	108,800.	21,760.	ppb	0.30	200000.	
27 Al	377,100.	75,420.	ppb	0.48	200000.	
28 Si	-247.	-49.4	ppb	178.87	#VALUE!	
29 Si	-8,730.	-1,746.	ppb	5.34	10000.	LOW
39 K	29,015.	5,803.	ppb	1.13	200000.	
43 Ca	221,250.	44,250.	ppb	0.98	#VALUE!	
44 Ca	211,650.	42,330.	ppb	0.78	200000.	
51 V	2,290.	458.	ppb	1.65	1000.	
52 Cr	337.25	67.45	ppb	1.42	1000.	
53 Cr	357.25	71.45	ppb	1.69	#VALUE!	
55 Mn	7,655.	1,531.	ppb	1.18	1000.	>LDR
56 Fe	589,500.	117,900.	ppb	1.12	#VALUE!	
57 Fe	559,000.	111,800.	ppb	1.36	100000.	>LDR
59 Co	316.7	63.34	ppb	1.38	1000.	
60 Ni	178.3	35.66	ppb	1.17	1000.	
63 Cu	1,183.	236.6	ppb	1.22	#VALUE!	
65 Cu	1,198.5	239.7	ppb	1.00	1000.	
66 Zn	1,244.5	248.9	ppb	1.11	1000.	
68 Zn	1,230.5	246.1	ppb	0.74	#VALUE!	
75 As	30.425	6.085	ppb	2.83	1000.	
82 Se	7.885	1.577	ppb	2.34	1000.	
88 Sr	3,082.	616.4	ppb	1.51	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	9.805	1.961	ppb	3.61	1000.	
107 Ag	0.4491	0.0898	ppb	11.48	500.	
109 Ag	0.4396	0.0879	ppb	4.54	#VALUE!	
111 Cd	0.8665	0.1733	ppb	10.31	#VALUE!	
114 Cd	0.9105	0.1821	ppb	7.39	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.76	5.152	ppb	1.53	1000.	
120 Sn	25.72	5.144	ppb	2.12	#VALUE!	
121 Sb	1.317	0.2634	ppb	1.06	#VALUE!	
123 Sb	1.378	0.2756	ppb	4.09	1000.	
135 Ba	1,058.5	211.7	ppb	1.13	1000.	
137 Ba	1,060.5	212.1	ppb	0.81	#VALUE!	
182 W	0.9605	0.1921	ppb ---		#VALUE!	
203 Tl	4.661	0.9322	ppb	4.17	1000.	
205 Tl	4.561	0.9122	ppb	3.32	#VALUE!	
208 Pb	773.	154.6	ppb	1.62	1000.	
232 Th	4.5695	0.9139	ppb	2.75	1000.	
238 U	4.833	0.9666	ppb	0.82	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2601173.00	2.15	2737811.30	95.0	69.5 - 130	
45 Sc	2283569.50	1.02	2016878.10	113.2	69.5 - 130	
72 Ge	415248.34	1.93	420175.84	98.8	69.5 - 130	
159 Tb	3877636.50	0.63	3819393.30	101.5	69.5 - 130	
209 Bi	2332663.30	1.24	2381090.80	98.0	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000224

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\057SMPL.D\057SMPL.D#
Date Acquired: Jul 28 2014 02:59 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-005
Misc Info: DILUTION 1.6/8
Vial Number: 2211
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	4.869	0.9738	ppb	2.99	100.	
11 B	48.665	9.733	ppb	1.39	1000.	
23 Na	8,330.	1,666.	ppb	1.91	200000.	
25 Mg	76,300.	15,260.	ppb	1.29	200000.	
27 Al	416,700.	83,340.	ppb	1.40	200000.	
28 Si	-636.5	-127.3	ppb	68.24	#VALUE!	
29 Si	-9,820.	-1,964.	ppb	11.62	10000.	LOW
39 K	17,165.	3,433.	ppb	1.40	200000.	
43 Ca	98,800.	19,760.	ppb	0.19	#VALUE!	
44 Ca	95,100.	19,020.	ppb	0.86	200000.	
51 V	2,831.	566.2	ppb	1.28	1000.	
52 Cr	529.5	105.9	ppb	1.39	1000.	
53 Cr	545.5	109.1	ppb	1.74	#VALUE!	
55 Mn	9,430.	1,886.	ppb	1.28	1000.	>LDR
56 Fe	737,000.	147,400.	ppb	1.04	#VALUE!	
57 Fe	701,500.	140,300.	ppb	1.41	100000.	>LDR
59 Co	506.5	101.3	ppb	1.37	1000.	
60 Ni	187.9	37.58	ppb	1.22	1000.	
63 Cu	1,208.5	241.7	ppb	1.33	#VALUE!	
65 Cu	1,225.5	245.1	ppb	1.44	1000.	
66 Zn	1,128.	225.6	ppb	0.59	1000.	
68 Zn	1,129.	225.8	ppb	1.32	#VALUE!	
75 As	12.395	2.479	ppb	7.11	1000.	
82 Se	24.115	4.823	ppb	6.20	1000.	
88 Sr	1,188.5	237.7	ppb	1.85	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	27.695	5.539	ppb	3.95	1000.	
107 Ag	0.4922	0.0984	ppb	8.89	500.	
109 Ag	0.4415	0.0883	ppb	11.15	#VALUE!	
111 Cd	0.808	0.1616	ppb	7.64	#VALUE!	
114 Cd	0.687	0.1374	ppb	5.97	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	26.17	5.234	ppb	0.72	1000.	
120 Sn	26.3	5.26	ppb	2.53	#VALUE!	
121 Sb	0.9705	0.1941	ppb	7.62	#VALUE!	
123 Sb	1.0105	0.2021	ppb	2.58	1000.	
135 Ba	1,479.	295.8	ppb	1.58	1000.	
137 Ba	1,477.5	295.5	ppb	1.47	#VALUE!	
182 W	1.174	0.2348	ppb ---		#VALUE!	
203 Tl	6.5	1.3	ppb	2.71	1000.	
205 Tl	6.46	1.292	ppb	4.19	#VALUE!	
208 Pb	54.05	10.81	ppb	2.20	1000.	
232 Th	7.67	1.534	ppb	3.06	1000.	
238 U	6.365	1.273	ppb	2.46	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2562943.00	1.75	2737811.30	93.6	69.5 - 130	
45 Sc	2306186.80	1.78	2016878.10	114.3	69.5 - 130	
72 Ge	411644.09	1.67	420175.84	98.0	69.5 - 130	
159 Tb	3789837.80	1.03	3819393.30	99.2	69.5 - 130	
209 Bi	2315853.80	1.67	2381090.80	97.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000225

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\058SMPL.D\058SMPL.D#
Date Acquired: Jul 28 2014 03:02 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-006
Misc Info: DILUTION 1.6/8
Vial Number: 2212
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	3.983	0.7966	ppb	0.95	100.	
11 B	97.6	19.52	ppb	3.51	1000.	
23 Na	22,100.	4,420.	ppb	0.85	200000.	
25 Mg	103,500.	20,700.	ppb	1.65	200000.	
27 Al	481,550.	96,310.	ppb	1.49	200000.	
28 Si	-1,405.5	-281.1	ppb	19.22	#VALUE!	
29 Si	-10,180.	-2,036.	ppb	6.97	10000.	LOW
39 K	1,480.5	296.1	ppb	2.12	200000.	
43 Ca	89,300.	17,860.	ppb	2.15	#VALUE!	
44 Ca	87,650.	17,530.	ppb	1.73	200000.	
51 V	2,741.5	548.3	ppb	1.63	1000.	
52 Cr	139.05	27.81	ppb	1.63	1000.	
53 Cr	154.35	30.87	ppb	2.39	#VALUE!	
55 Mn	14,985.	2,997.	ppb	0.96	1000.	>LDR
56 Fe	702,500.	140,500.	ppb	1.10	#VALUE!	
57 Fe	663,000.	132,600.	ppb	1.13	100000.	>LDR
59 Co	385.95	77.19	ppb	1.46	1000.	
60 Ni	90.45	18.09	ppb	2.06	1000.	
63 Cu	683.5	136.7	ppb	1.01	#VALUE!	
65 Cu	689.5	137.9	ppb	0.96	1000.	
66 Zn	931.	186.2	ppb	1.36	1000.	
68 Zn	925.5	185.1	ppb	1.50	#VALUE!	
75 As	11.37	2.274	ppb	7.34	1000.	
82 Se	10.635	2.127	ppb	17.13	1000.	
88 Sr	1,046.5	209.3	ppb	1.66	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	3.122	0.6244	ppb	6.26	1000.	
107 Ag	1.0435	0.2087	ppb	3.39	500.	
109 Ag	1.0115	0.2023	ppb	4.30	#VALUE!	
111 Cd	0.847	0.1694	ppb	20.93	#VALUE!	
114 Cd	1.0105	0.2021	ppb	10.88	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	23.415	4.683	ppb	2.10	1000.	
120 Sn	23.39	4.678	ppb	1.10	#VALUE!	
121 Sb	0.5875	0.1175	ppb	7.19	#VALUE!	
123 Sb	0.503	0.1006	ppb	14.07	1000.	
135 Ba	928.5	185.7	ppb	1.43	1000.	
137 Ba	936.	187.2	ppb	1.47	#VALUE!	
182 W	0.155	0.031	ppb ---		#VALUE!	
203 Tl	0.2726	0.0545	ppb	7.43	1000.	
205 Tl	0.2843	0.0569	ppb	7.02	#VALUE!	
208 Pb	25.86	5.172	ppb	1.76	1000.	
232 Th	5.005	1.001	ppb	1.79	1000.	
238 U	2.851	0.5702	ppb	2.10	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2561755.80	2.14	2737811.30	93.6	69.5 - 130	
45 Sc	2240461.80	1.55	2016878.10	111.1	69.5 - 130	
72 Ge	406926.22	1.62	420175.84	96.8	69.5 - 130	
159 Tb	3841172.50	1.90	3819393.30	100.6	69.5 - 130	
209 Bi	2324374.00	1.33	2381090.80	97.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000226

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\059SMPL.D\059SMPL.D#
Date Acquired: Jul 28 2014 03:06 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-007
Misc Info: DILUTION 1.6/8
Vial Number: 2301
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.03	1.006	ppb	1.49	100.	
11 B	59.4	11.88	ppb	3.01	1000.	
23 Na	7,085.	1,417.	ppb	1.25	200000.	
25 Mg	73,900.	14,780.	ppb	0.73	200000.	
27 Al	405,350.	81,070.	ppb	0.72	200000.	
28 Si	-1,881.	-376.2	ppb	9.73	#VALUE!	
29 Si	-9,850.	-1,970.	ppb	2.38	10000.	LOW
39 K	11,415.	2,283.	ppb	0.82	200000.	
43 Ca	205,050.	41,010.	ppb	0.57	#VALUE!	
44 Ca	196,100.	39,220.	ppb	0.58	200000.	
51 V	3,142.	628.4	ppb	0.47	1000.	
52 Cr	456.95	91.39	ppb	0.34	1000.	
53 Cr	473.35	94.67	ppb	0.18	#VALUE!	
55 Mn	17,880.	3,576.	ppb	0.58	1000.	>LDR
56 Fe	810,500.	162,100.	ppb	0.04	#VALUE!	
57 Fe	770,000.	154,000.	ppb	0.67	100000.	>LDR
59 Co	567.5	113.5	ppb	0.66	1000.	
60 Ni	183.15	36.63	ppb	0.88	1000.	
63 Cu	1,155.	231.	ppb	0.27	#VALUE!	
65 Cu	1,170.	234.	ppb	0.19	1000.	
66 Zn	1,094.5	218.9	ppb	0.71	1000.	
68 Zn	1,108.5	221.7	ppb	0.66	#VALUE!	
75 As	24.515	4.903	ppb	2.38	1000.	
82 Se	15.53	3.106	ppb	14.75	1000.	
88 Sr	2,962.	592.4	ppb	0.67	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	17.375	3.475	ppb	2.74	1000.	
107 Ag	1.016	0.2032	ppb	5.55	500.	
109 Ag	0.9315	0.1863	ppb	11.54	#VALUE!	
111 Cd	4.818	0.9636	ppb	12.00	#VALUE!	
114 Cd	4.927	0.9854	ppb	2.77	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	27.81	5.562	ppb	3.37	1000.	
120 Sn	27.33	5.466	ppb	0.47	#VALUE!	
121 Sb	1.967	0.3934	ppb	5.47	#VALUE!	
123 Sb	2.046	0.4092	ppb	8.68	1000.	
135 Ba	1,892.5	378.5	ppb	0.27	1000.	
137 Ba	1,899.	379.8	ppb	0.39	#VALUE!	
182 W	0.4636	0.0927	ppb ---		#VALUE!	
203 Tl	3.2415	0.6483	ppb	3.60	1000.	
205 Tl	3.214	0.6428	ppb	3.58	#VALUE!	
208 Pb	90.6	18.12	ppb	0.49	1000.	
232 Th	8.615	1.723	ppb	2.72	1000.	
238 U	6.41	1.282	ppb	2.02	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2497754.80	0.20	2737811.30	91.2	69.5 - 130	
45 Sc	2213158.80	0.80	2016878.10	109.7	69.5 - 130	
72 Ge	396587.22	0.72	420175.84	94.4	69.5 - 130	
159 Tb	3705191.30	0.47	3819393.30	97.0	69.5 - 130	
209 Bi	2266350.80	0.17	2381090.80	95.2	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000227

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\060SMPL.D\060SMPL.D#
Date Acquired: Jul 28 2014 03:09 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-008
Misc Info: DILUTION 1.6/8
Vial Number: 2302
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.33	1.066	ppb	2.79	100.	
11 B	50.2	10.04	ppb	0.52	1000.	
23 Na	13,185.	2,637.	ppb	0.57	200000.	
25 Mg	133,400.	26,680.	ppb	1.29	200000.	
27 Al	505,500.	101,100.	ppb	1.35	200000.	
28 Si	8,960.	1,792.	ppb	2.08	#VALUE!	
29 Si	102.25	20.45	ppb	320.98	10000.	
39 K	40,930.	8,186.	ppb	0.31	200000.	
43 Ca	120,050.	24,010.	ppb	0.50	#VALUE!	
44 Ca	116,300.	23,260.	ppb	0.38	200000.	
51 V	3,133.5	626.7	ppb	1.21	1000.	
52 Cr	538.5	107.7	ppb	0.75	1000.	
53 Cr	556.5	111.3	ppb	1.27	#VALUE!	
55 Mn	16,640.	3,328.	ppb	0.58	1000.	>LDR
56 Fe	883,500.	176,700.	ppb	0.56	#VALUE!	
57 Fe	832,500.	166,500.	ppb	0.65	100000.	>LDR
59 Co	409.7	81.94	ppb	0.44	1000.	
60 Ni	226.65	45.33	ppb	0.94	1000.	
63 Cu	1,540.	308.	ppb	0.47	#VALUE!	
65 Cu	1,606.5	321.3	ppb	0.51	1000.	
66 Zn	1,326.5	265.3	ppb	0.40	1000.	
68 Zn	1,343.	268.6	ppb	0.32	#VALUE!	
75 As	13.765	2.753	ppb	8.72	1000.	
82 Se	14.545	2.909	ppb	4.24	1000.	
88 Sr	1,080.	216.	ppb	1.17	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	8.145	1.629	ppb	1.04	1000.	
107 Ag	0.574	0.1148	ppb	1.98	500.	
109 Ag	0.5565	0.1113	ppb	5.82	#VALUE!	
111 Cd	1.2335	0.2467	ppb	0.49	#VALUE!	
114 Cd	0.97	0.194	ppb	4.66	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	25.76	5.152	ppb	0.85	1000.	
120 Sn	26.1	5.22	ppb	1.19	#VALUE!	
121 Sb	0.527	0.1054	ppb	14.76	#VALUE!	
123 Sb	0.4618	0.0924	ppb	1.26	1000.	
135 Ba	2,332.5	466.5	ppb	0.41	1000.	
137 Ba	2,347.5	469.5	ppb	0.60	#VALUE!	
182 W	0.6835	0.1367	ppb ---		#VALUE!	
203 Tl	8.065	1.613	ppb	1.70	1000.	
205 Tl	7.98	1.596	ppb	1.09	#VALUE!	
208 Pb	37.945	7.589	ppb	1.40	1000.	
232 Th	7.125	1.425	ppb	1.37	1000.	
238 U	7.295	1.459	ppb	2.10	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2474129.30	0.36	2737811.30	90.4	69.5 - 130	
45 Sc	2291500.00	1.02	2016878.10	113.6	69.5 - 130	
72 Ge	396505.06	1.10	420175.84	94.4	69.5 - 130	
159 Tb	3637120.00	0.52	3819393.30	95.2	69.5 - 130	
209 Bi	2204886.30	1.26	2381090.80	92.6	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000228

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\061SMPL.D\061SMPL.D#
Date Acquired: Jul 28 2014 03:13 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-008L
Misc Info: DILUTION 0.4/10
Vial Number: 2303
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 25.00
Autodil Factor: Undiluted
Final Dil Factor: 25.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	5.345	0.2138	ppb	6.28	100.	
11 B	56.425	2.257	ppb	2.22	1000.	
23 Na	17,727.5	709.1	ppb	1.06	200000.	
25 Mg	170,675.	6,827.	ppb	0.12	200000.	
27 Al	638,750.	25,550.	ppb	0.89	200000.	
28 Si	9,502.5	380.1	ppb	13.66	#VALUE!	
29 Si	9,677.5	387.1	ppb	21.41	10000.	
39 K	51,875.	2,075.	ppb	0.43	200000.	
43 Ca	149,675.	5,987.	ppb	1.89	#VALUE!	
44 Ca	151,325.	6,053.	ppb	0.38	200000.	
51 V	3,405.	136.2	ppb	1.01	1000.	
52 Cr	586.25	23.45	ppb	0.23	1000.	
53 Cr	529.	21.16	ppb	0.53	#VALUE!	
55 Mn	18,387.5	735.5	ppb	1.34	1000.	
56 Fe	969,500.	38,780.	ppb	0.83	#VALUE!	
57 Fe	929,500.	37,180.	ppb	0.35	100000.	
59 Co	449.	17.96	ppb	0.73	1000.	
60 Ni	255.75	10.23	ppb	0.41	1000.	
63 Cu	1,786.	71.44	ppb	0.22	#VALUE!	
65 Cu	1,823.	72.92	ppb	0.74	1000.	
66 Zn	1,488.5	59.54	ppb	2.20	1000.	
68 Zn	1,456.25	58.25	ppb	0.79	#VALUE!	
75 As	18.665	0.7466	ppb	25.72	1000.	
82 Se	15.305	0.6122	ppb	5.30	1000.	
88 Sr	1,176.	47.04	ppb	0.67	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	8.8525	0.3541	ppb	7.10	1000.	
107 Ag	0.7735	0.0309	ppb	7.74	500.	
109 Ag	0.627	0.0251	ppb	1.54	#VALUE!	
111 Cd	-2.52	-0.1008	ppb	9.65	#VALUE!	
114 Cd	1.0685	0.0427	ppb	14.66	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	27.325	1.093	ppb	3.49	1000.	
120 Sn	27.05	1.082	ppb	3.90	#VALUE!	
121 Sb	0.4955	0.0198	ppb	31.24	#VALUE!	
123 Sb	0.5878	0.0235	ppb	23.81	1000.	
135 Ba	2,421.75	96.87	ppb	1.73	1000.	
137 Ba	2,423.5	96.94	ppb	1.56	#VALUE!	
182 W	0.6995	0.028	ppb ---		#VALUE!	
203 Tl	7.6575	0.3063	ppb	4.44	1000.	
205 Tl	7.8525	0.3141	ppb	2.99	#VALUE!	
208 Pb	37.45	1.498	ppb	0.83	1000.	
232 Th	7.085	0.2834	ppb	1.61	1000.	
238 U	7.0625	0.2825	ppb	1.56	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2445662.50	1.68	2737811.30	89.3	69.5 - 130	
45 Sc	1902526.00	0.79	2016878.10	94.3	69.5 - 130	
72 Ge	378281.34	0.76	420175.84	90.0	69.5 - 130	
159 Tb	3666731.50	0.89	3819393.30	96.0	69.5 - 130	
209 Bi	2316804.30	0.14	2381090.80	97.3	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

0 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Pass
ISTD: Pass

Katahdin Analytical Services 4000229

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\062SMPL.D\062SMPL.D#
Date Acquired: Jul 28 2014 03:16 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-008A
Misc Info: DILUTION 1.6/8
Vial Number: 2304
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	14.405	2.881	ppb	0.17	100.	
11 B	230.9	46.18	ppb	3.35	1000.	
23 Na	20,335.	4,067.	ppb	1.10	200000.	
25 Mg	133,150.	26,630.	ppb	1.46	200000.	
27 Al	510,500.	102,100.	ppb	1.91	200000.	
28 Si	12,235.	2,447.	ppb	1.23	#VALUE!	
29 Si	4,955.5	991.1	ppb	13.71	10000.	
39 K	48,520.	9,704.	ppb	1.04	200000.	
43 Ca	119,700.	23,940.	ppb	1.53	#VALUE!	
44 Ca	116,200.	23,240.	ppb	1.18	200000.	
51 V	3,119.	623.8	ppb	0.82	1000.	
52 Cr	575.	115.	ppb	0.86	1000.	
53 Cr	593.	118.6	ppb	1.49	#VALUE!	
55 Mn	16,480.	3,296.	ppb	0.75	1000.	>LDR
56 Fe	872,000.	174,400.	ppb	1.26	#VALUE!	
57 Fe	829,500.	165,900.	ppb	0.75	100000.	>LDR
59 Co	414.85	82.97	ppb	1.15	1000.	
60 Ni	242.5	48.5	ppb	1.03	1000.	
63 Cu	1,546.	309.2	ppb	0.73	#VALUE!	
65 Cu	1,611.5	322.3	ppb	1.18	1000.	
66 Zn	1,396.5	279.3	ppb	0.51	1000.	
68 Zn	1,409.	281.8	ppb	0.55	#VALUE!	
75 As	55.05	11.01	ppb	3.57	1000.	
82 Se	58.75	11.75	ppb	2.95	1000.	
88 Sr	1,104.	220.8	ppb	1.03	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	52.4	10.48	ppb	1.08	1000.	
107 Ag	9.155	1.831	ppb	1.91	500.	
109 Ag	9.4	1.88	ppb	1.40	#VALUE!	
111 Cd	9.915	1.983	ppb	5.72	#VALUE!	
114 Cd	9.955	1.991	ppb	1.82	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	69.55	13.91	ppb	0.67	1000.	
120 Sn	70.15	14.03	ppb	1.06	#VALUE!	
121 Sb	9.68	1.936	ppb	1.74	#VALUE!	
123 Sb	9.905	1.981	ppb	1.23	1000.	
135 Ba	2,340.5	468.1	ppb	0.77	1000.	
137 Ba	2,351.	470.2	ppb	0.86	#VALUE!	
182 W	48.74	9.748	ppb ---		#VALUE!	
203 Tl	17.535	3.507	ppb	2.63	1000.	
205 Tl	17.725	3.545	ppb	1.75	#VALUE!	
208 Pb	47.065	9.413	ppb	1.03	1000.	
232 Th	17.095	3.419	ppb	1.11	1000.	
238 U	17.14	3.428	ppb	1.52	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2484819.00	0.59	2737811.30	90.8	69.5 - 130	
45 Sc	2269753.80	1.29	2016878.10	112.5	69.5 - 130	
72 Ge	393682.00	0.44	420175.84	93.7	69.5 - 130	
159 Tb	3565846.50	0.78	3819393.30	93.4	69.5 - 130	
209 Bi	2164925.50	0.67	2381090.80	90.9	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000230

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\063SMPL.D\063SMPL.D#
Date Acquired: Jul 28 2014 03:20 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-008S
Misc Info: DILUTION 1.6/8
Vial Number: 2305
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	49.415	9.883	ppb	1.66	100.	
11 B	434.05	86.81	ppb	2.33	1000.	
23 Na	14,285.	2,857.	ppb	0.66	200000.	
25 Mg	109,450.	21,890.	ppb	1.28	200000.	
27 Al	548,000.	109,600.	ppb	0.89	200000.	
28 Si	16,970.	3,394.	ppb	0.64	#VALUE!	
29 Si	8,975.	1,795.	ppb	2.81	10000.	
39 K	52,550.	10,510.	ppb	0.46	200000.	
43 Ca	86,700.	17,340.	ppb	0.40	#VALUE!	
44 Ca	84,600.	16,920.	ppb	0.30	200000.	
51 V	3,535.	707.	ppb	0.04	1000.	
52 Cr	683.	136.6	ppb	0.57	1000.	
53 Cr	701.5	140.3	ppb	1.99	#VALUE!	
55 Mn	9,990.	1,998.	ppb	0.44	1000.	>LDR
56 Fe	885,000.	177,000.	ppb	0.36	#VALUE!	
57 Fe	838,500.	167,700.	ppb	0.60	100000.	>LDR
59 Co	772.	154.4	ppb	0.56	1000.	
60 Ni	628.5	125.7	ppb	0.32	1000.	
63 Cu	1,634.5	326.9	ppb	1.31	#VALUE!	
65 Cu	1,701.	340.2	ppb	1.13	1000.	
66 Zn	1,735.5	347.1	ppb	0.30	1000.	
68 Zn	1,775.5	355.1	ppb	0.67	#VALUE!	
75 As	93.2	18.64	ppb	1.57	1000.	
82 Se	97.65	19.53	ppb	0.72	1000.	
88 Sr	1,231.	246.2	ppb	0.27	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	188.7	37.74	ppb	0.88	1000.	
107 Ag	44.41	8.882	ppb	0.76	500.	
109 Ag	44.305	8.861	ppb	0.59	#VALUE!	
111 Cd	217.25	43.45	ppb	0.76	#VALUE!	
114 Cd	217.15	43.43	ppb	0.30	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	439.2	87.84	ppb	0.75	1000.	
120 Sn	439.05	87.81	ppb	0.81	#VALUE!	
121 Sb	11.705	2.341	ppb	1.98	#VALUE!	
123 Sb	11.585	2.317	ppb	3.27	1000.	
135 Ba	3,984.	796.8	ppb	0.62	1000.	
137 Ba	4,005.5	801.1	ppb	0.52	#VALUE!	
182 W	14.3	2.86	ppb ---		#VALUE!	
203 Tl	109.8	21.96	ppb	1.12	1000.	
205 Tl	109.2	21.84	ppb	0.90	#VALUE!	
208 Pb	137.9	27.58	ppb	0.66	1000.	
232 Th	6.4	1.28	ppb	0.35	1000.	
238 U	108.25	21.65	ppb	0.65	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2470718.00	1.16	2737811.30	90.2	69.5 - 130	
45 Sc	2306186.80	0.22	2016878.10	114.3	69.5 - 130	
72 Ge	389302.25	0.80	420175.84	92.7	69.5 - 130	
159 Tb	3585004.50	0.55	3819393.30	93.9	69.5 - 130	
209 Bi	2151603.80	1.19	2381090.80	90.4	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000231

Sample QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\064SMPL.D\064SMPL.D#
Date Acquired: Jul 28 2014 03:23 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: SH4986-008P
Misc Info: DILUTION 1.6/8
Vial Number: 2306
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: Sample
Dilution Factor: 5.00
Autodil Factor: Undiluted
Final Dil Factor: 5.00

QC Elements

Element	Corr Conc	Raw Conc	Units	RSD(%)	High Limit	Flag
9 Be	46.76	9.352	ppb	0.68	100.	
11 B	430.3	86.06	ppb	0.47	1000.	
23 Na	23,700.	4,740.	ppb	0.27	200000.	
25 Mg	140,950.	28,190.	ppb	0.70	200000.	
27 Al	531,000.	106,200.	ppb	0.70	200000.	
28 Si	14,145.	2,829.	ppb	2.37	#VALUE!	
29 Si	9,720.	1,944.	ppb	3.66	10000.	
39 K	40,780.	8,156.	ppb	0.39	200000.	
43 Ca	166,050.	33,210.	ppb	0.91	#VALUE!	
44 Ca	160,900.	32,180.	ppb	0.72	200000.	
51 V	2,971.	594.2	ppb	0.87	1000.	
52 Cr	534.5	106.9	ppb	0.92	1000.	
53 Cr	552.	110.4	ppb	1.59	#VALUE!	
55 Mn	12,230.	2,446.	ppb	0.95	1000.	>LDR
56 Fe	714,000.	142,800.	ppb	0.86	#VALUE!	
57 Fe	679,500.	135,900.	ppb	0.91	100000.	>LDR
59 Co	747.5	149.5	ppb	1.72	1000.	
60 Ni	618.	123.6	ppb	0.65	1000.	
63 Cu	1,717.	343.4	ppb	1.06	#VALUE!	
65 Cu	1,785.	357.	ppb	1.09	1000.	
66 Zn	1,571.	314.2	ppb	0.58	1000.	
68 Zn	1,621.	324.2	ppb	0.70	#VALUE!	
75 As	95.25	19.05	ppb	1.58	1000.	
82 Se	92.6	18.52	ppb	0.35	1000.	
88 Sr	1,782.5	356.5	ppb	0.11	1000.	
89 Y	----	--------	--- ---		#VALUE!	
98 Mo	205.5	41.1	ppb	0.46	1000.	
107 Ag	44.58	8.916	ppb	1.58	500.	
109 Ag	44.47	8.894	ppb	0.60	#VALUE!	
111 Cd	215.65	43.13	ppb	1.33	#VALUE!	
114 Cd	215.85	43.17	ppb	0.59	1000.	
115 In	----	--------	--- ---		#VALUE!	
118 Sn	441.25	88.25	ppb	0.73	1000.	
120 Sn	441.4	88.28	ppb	0.38	#VALUE!	
121 Sb	14.54	2.908	ppb	2.31	#VALUE!	
123 Sb	14.55	2.91	ppb	2.68	1000.	
135 Ba	3,860.5	772.1	ppb	0.48	1000.	
137 Ba	3,871.5	774.3	ppb	0.27	#VALUE!	
182 W	18.725	3.745	ppb ---		#VALUE!	
203 Tl	104.9	20.98	ppb	1.21	1000.	
205 Tl	104.35	20.87	ppb	0.85	#VALUE!	
208 Pb	123.7	24.74	ppb	0.69	1000.	
232 Th	4.7365	0.9473	ppb	2.18	1000.	
238 U	106.45	21.29	ppb	0.87	1000.	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2497091.30	0.07	2737811.30	91.2	69.5 - 130	
45 Sc	2118942.50	0.39	2016878.10	105.1	69.5 - 130	
72 Ge	382801.38	0.76	420175.84	91.1	69.5 - 130	
159 Tb	3549348.30	0.51	3819393.30	92.9	69.5 - 130	
209 Bi	2160468.50	1.04	2381090.80	90.7	69.5 - 130	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

2 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000232

CCV QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\065_CCV.D\065_CCV.D#
Date Acquired: Jul 28 2014 03:27 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCV
Misc Info:
Vial Number: 1206
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Dilution Factor: 1.00
QC Range (%): 89.5 - 110.5

QC Elements

Element	Conc.		RSD(%)	Expected	Rec (%)	Flag
9 Be	22.92	ppb	0.57	25	91.68	
11 B	26.34	ppb	1.11	25	105.36	
23 Na	5,015.	ppb	0.50	5,000	100.3	
25 Mg	5,083.	ppb	0.65	5,000	101.66	
27 Al	516.3	ppb	0.04	500	103.26	
28 Si	399.5	ppb	23.38	500	79.9	
29 Si	896.5	ppb	18.46	500	179.3	Fail
39 K	4,952.	ppb	0.32	5,000	99.04	
43 Ca	4,934.	ppb	0.51	5,000	98.68	
44 Ca	4,867.	ppb	0.43	5,000	97.34	
51 V	24.28	ppb	1.42	25	97.12	
52 Cr	24.22	ppb	1.42	25	96.88	
53 Cr	20.84	ppb	2.45	25	83.36	
55 Mn	25.14	ppb	0.87	25	100.56	
56 Fe	4,954.	ppb	1.75	5,000	99.08	
57 Fe	4,816.	ppb	1.18	5,000	96.32	
59 Co	24.47	ppb	2.87	25	97.88	
60 Ni	24.48	ppb	0.95	25	97.92	
63 Cu	24.56	ppb	0.48	25	98.24	
65 Cu	24.9	ppb	0.56	25	99.6	
66 Zn	24.65	ppb	0.68	25	98.6	
68 Zn	22.43	ppb	3.59	25	89.72	
75 As	24.67	ppb	0.63	25	98.68	
82 Se	25.3	ppb	2.02	25	101.2	
88 Sr	25.45	ppb	1.94	25	101.8	
89 Y	--------	---	--------	---	#VALUE!	
98 Mo	25.19	ppb	1.28	25	100.76	
107 Ag	25.33	ppb	0.98	25	101.32	
109 Ag	25.28	ppb	2.02	25	101.12	
111 Cd	25.27	ppb	1.71	25	101.08	
114 Cd	25.69	ppb	1.05	25	102.76	
115 In	--------	---	--------	---	#VALUE!	
118 Sn	23.95	ppb	0.54	25	95.8	
120 Sn	23.99	ppb	1.02	25	95.96	
121 Sb	23.63	ppb	1.09	25	94.52	
123 Sb	24.06	ppb	0.19	25	96.24	
135 Ba	24.03	ppb	1.05	25	96.12	
137 Ba	24.02	ppb	0.61	25	96.08	
182 W	24.7	ppb	1.24	25	98.8	
203 Tl	24.56	ppb	1.29	25	98.24	
205 Tl	24.58	ppb	0.52	25	98.32	
208 Pb	24.54	ppb	0.77	25	98.16	
232 Th	24.34	ppb	1.43	25	97.36	
238 U	24.76	ppb	0.26	25	99.04	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2481283.80	0.71	2737811.30	90.6	80 - 120.4	
45 Sc	1801459.40	0.62	2016878.10	89.3	80 - 120.4	
72 Ge	374891.66	1.50	420175.84	89.2	80 - 120.4	
159 Tb	3651446.50	0.80	3819393.30	95.6	80 - 120.4	
209 Bi	2313819.30	1.02	2381090.80	97.2	80 - 120.4	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:
Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000233

CCB QC Report

Data File: C:\ICPCHEM\1\DATA\JHG28A.B\066_CCB.D\066_CCB.D#
Date Acquired: Jul 28 2014 03:30 pm
Acq. Method: K2008ES2.M
Operator: EAM
Sample Name: CCB
Misc Info:
Vial Number: 1207
Current Method: C:\ICPCHEM\1\METHODS\K2008ES2.M
Calibration File: C:\ICPCHEM\1\CALIB\K2008ES2.C
Last Cal. Update: Jul 28 2014 12:48 pm
Sample Type: 6-CCB
Dilution Factor: 1.00

QC Elements

Element	Conc.		RSD(%)	High Limit	Flag
9 Be	0.005	ppb	30.44	1.00	
11 B	1.052	ppb	16.47	1.00	
23 Na	31.69	ppb	2.72	1.00	
25 Mg	0.8713	ppb	25.50	1.00	
27 Al	0.6464	ppb	32.72	1.00	
28 Si	-87.69	ppb	94.07	1.00	
29 Si	689.6	ppb	25.33	1.00	Fail
39 K	2.616	ppb	174.69	1.00	
43 Ca	-0.5211	ppb	257.53	1.00	
44 Ca	-12.65	ppb	16.72	1.00	
51 V	-0.0033	ppb	2464.40	1.00	
52 Cr	-0.0637	ppb	29.85	1.00	
53 Cr	-3.461	ppb	7.91	1.00	
55 Mn	0.3409	ppb	5.48	1.00	
56 Fe	-8.712	ppb	16.01	1.00	
57 Fe	-8.747	ppb	76.63	1.00	
59 Co	-0.0082	ppb	43.82	1.00	
60 Ni	0.0116	ppb	215.38	1.00	
63 Cu	0.0807	ppb	12.55	1.00	
65 Cu	0.0901	ppb	6.37	1.00	
66 Zn	0.0353	ppb	52.39	1.00	
68 Zn	-2.26	ppb	15.48	1.00	
75 As	0.0676	ppb	44.86	1.00	
82 Se	-0.338	ppb	122.34	1.00	
88 Sr	-0.0014	ppb	157.46	1.00	
89 Y	--------	---	--------	---	
98 Mo	0.0752	ppb	10.30	1.00	
107 Ag	0.0042	ppb	16.35	1.00	
109 Ag	0.0014	ppb	239.37	1.00	
111 Cd	-0.1524	ppb	21.06	1.00	
114 Cd	0.0023	ppb	91.54	1.00	
115 In	--------	---	--------	---	
118 Sn	0.08	ppb	20.01	1.00	
120 Sn	0.0755	ppb	31.67	1.00	
121 Sb	0.0164	ppb	55.82	1.00	
123 Sb	0.0141	ppb	51.54	1.00	
135 Ba	0.0083	ppb	58.88	1.00	
137 Ba	0.0114	ppb	30.83	1.00	
182 W	0.0969	ppb	9.98	1.00	
203 Tl	0.013	ppb	61.31	1.00	
205 Tl	0.0094	ppb	8.62	1.00	
208 Pb	-0.0044	ppb	116.93	1.00	
232 Th	0.0337	ppb	46.07	1.00	
238 U	0.0018	ppb	36.13	1.00	

ISTD Elements

Element	CPS Mean	RSD(%)	Ref Value	Rec(%)	QC Range(%)	Flag
6 Li	2436235.00	0.91	2737811.30	89.0	79.5 - 120	
45 Sc	1785164.40	0.66	2016878.10	88.5	79.5 - 120	
72 Ge	373394.16	1.92	420175.84	88.9	79.5 - 120	
159 Tb	3594432.50	1.77	3819393.30	94.1	79.5 - 120	
209 Bi	2328294.80	1.36	2381090.80	97.8	79.5 - 120	

ISTD Ref File : C:\ICPCHEM\1\DATA\JHG28A.B\013CALB.D\013CALB.D#

1 :Element Failures 0 :Max. Number of Failures Allowed
0 :ISTD Failures 0 :Max. Number of ISTD Failures Allowed

Data Results:

Analytes: Fail
ISTD: Pass

Katahdin Analytical Services 4000234

Logbooks and Supporting Documents

Katahdin Analytical Services, Inc. **Metals Preparation Benchsheet**

Reagent Information:

HNO3: 67379 HCL: 61942 H2O2: N/A **Method:** 3010-MS

LCS / Spike **LCS/Spiking Information:**

- [x] [x] CLPP-SPK-1 (ID/Vol): MS1870 / 0.050 mL
- [x] [x] CLPP-SPK-INT1 (ID/Vol): MW14850 / 0.500 mL
- [x] [x] CLPP-SPK-INT2 (ID/Vol): MW14948 / 0.500 mL
- [ ] [ ] Uranium Spike (ID/Vol): N/A / ____ mL
- [ ] [ ] CLPP-SPK-4 (ID/Vol): N/A / ____ mL

Hot Plate/Block ID : A

Start Time: 10:08 /Temp.(90-95°C) : 90

End Time: 14:59 /Temp.(90-95°C) : 93

Thermometer ID/Pos.: N/A / 1:6

Filter Paper: N/A

REVIEWED

EGJ 07/09/14

KATAHDIN ANALYTICAL METALS SECTION

Sample ID	Batch ID	Initial Wt/Vol	Initial Units	Final Vol	Final Units	MX	Meth	Anal.	Date	Initial Color	Initial Clarity	Final Color	Final Clarity	Artifacts	Bottle
LCSWHG09IMW2	HG09IMW2	0.05	L	0.05	L	AQ	IM	GEJ	07/09/2014	N/A	N/A	N/A	N/A		
PBWHG09IMW2	HG09IMW2		L		L	AQ	IM	GEJ	07/09/2014	N/A	N/A	N/A	N/A		
SH4986-009	HG09IMW2		L		L	AQ	IM	GEJ	07/09/2014						A
SH4986-009P	HG09IMW2		L		L	AQ	IM	GEJ	07/09/2014						
SH4986-009S	HG09IMW2		L		L	AQ	IM	GEJ	07/09/2014						

GJ 07.09.14

QA-064-Revision 2 - 01/08/2014 **Digestion performed by:** GEJ **On:** 07.09.14 **Page:** HG043 **Revision:** 00

Katahdin Analytical Services 4000236

Katahdin Analytical Services, Inc. **Metals Preparation Benchsheet**

Reagent Information:

HNO3: 67379 HCL: 6K142 H2O2: 311A20397 **Method:** 3050H

LCS / Spike **LCS/Spiking Information:**

- [x] [x] CLPP-SPK-1 (ID/Vol): MS1870 / 0.10 mL
- [x] [x] CLPP-SPK-INT1 (ID/Vol): MW14985 / 1.00 mL
- [x] [x] CLPP-SPK-INT2 (ID/Vol): MW14986 / 1.00 mL
- [ ] [ ] Uranium Spike (ID/Vol): N/A / mL
- [ ] [ ] CLPP-SPK-4 (ID/Vol): N/A / mL

LCSS: N/A Balance ID: B414476492

Hot Plate/Block ID: B
Start Time/Temp.: 1101 / 95 °C
End Time/Temp.: 1618 / 94 °C
Thermometer ID/Pos.: N/A / 6:1

Filter Paper: 9561846A

REVIEWED
gm 07.17.14
KATAHDIN ANALYTICAL
METALS SECTION

Sample ID	Batch ID	Initial Wt/Vol	Initial Units	Final Vol	Final Units	MX	Meth	Anal.	Date	Initial Color	Initial Texture	Final Color	Final Clarity	Artifacts	Bottle
LCSOHG15ICS1	HG15ICS1	1.00	g	0.10	L	SL	IC	GEJ	07/15/2014	N/A	N/A	N/A	N/A		
PBSHG15ICS1	HG15ICS1	1.00	g		L	SL	IC	GEJ	07/15/2014	N/A	N/A	N/A	N/A		
SH4966-001	HG15ICS1	1.42	g		L	SL	IC	GEJ	07/15/2014						B
SH5128-005	HG15ICS1	1.85	g		L	SL	IC	GEJ	07/15/2014						
SH5128-007	HG15ICS1	1.68	g		L	SL	IC	GEJ	07/15/2014						
SH5128-009	HG15ICS1	1.60	g		L	SL	IC	GEJ	07/15/2014						
SH5128-011	HG15ICS1	1.64	g		L	SL	IC	GEJ	07/15/2014						
SH5128-013	HG15ICS1	1.59	g		L	SL	IC	GEJ	07/15/2014						
SH5128-015	HG15ICS1	1.93	g		L	SL	IC	GEJ	07/15/2014						
SH5128-017	HG15ICS1	1.75	g		L	SL	IC	GEJ	07/15/2014						
SH5128-017P	HG15ICS1	1.89	g		L	SL	IC	GEJ	07/15/2014						
SH5128-017S	HG15ICS1	1.91	g		L	SL	IC	GEJ	07/15/2014						
SH5128-019	HG15ICS1	1.88	g		L	SL	IC	GEJ	07/15/2014						
SH5128-021	HG15ICS1	2.03	g		L	SL	IC	GEJ	07/15/2014						
SH5128-023	HG15ICS1	1.69	g		L	SL	IC	GEJ	07/15/2014						

GJ 07.16.14

 Digestion performed by: GEJ On: 07.15.15

Katahdin Analytical Services 4000237

CONVENTIONAL AND PHYSICAL ANALYTICAL DATA

QC Summary Section

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Blank Sample Summary Report

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG146313	SM2540	12-JUL-14	11-JUL-14	U 1 %	1 %	N/A

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Tel:(207) 874-2400 Fax:(207) 775-4029

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sales@katahdinlab.com

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Cert No E87604

Quality Control Report

Laboratory Control Sample Summary Report

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG146313-2	LCS	WG146313	12-JUL-14	11-JUL-14	%	90	92.	103	80-120	

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Cert No E87604

Quality Control Report

Duplicate Sample Summary Report

Total Solids

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG146313-3	SH4986-1	WG146313	12-JUL-14	%	83.	84.	1	20

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Sample Data Section

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS
(Refer to BOD Qualifiers Page for BOD footnotes)

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1	pH	H2	DO
H3	sulfite	H4	residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

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Cert No E87604

Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-1
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB09R-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	83. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:41:49	SM2540G	11-JUL-14	

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Cert No E87604

Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-2
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
APR-W67-SB09RP-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	82. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:03	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-3
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB10-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	84. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:17	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-4
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB11-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	87. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:31	SM2540G	11-JUL-14	

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Cert No E87604

Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-5
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB12-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	82. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:42:44	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-6
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB12-0709	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	77. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:43:08	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-7
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB13-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	87. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:44:00	SM2540G	11-JUL-14	

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Report of Analytical Results

Client: Michael Zamboni
CH2MHill
15010 Conference Center Drive
Chantilly,VA 20151

Lab Sample ID: SH4986-8
Report Date: 30-JUL-14
Client PO: No PO required; 4751
Project: CTO JM08 NAPR SWMU 6
SDG: SH4986

Sample Description	Matrix	Date Sampled	Date Received
NAPR-W67-SB14-0507	SL	03-JUL-14	08-JUL-14

Parameter	Result	Adj LOQ	Adj MDL	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Solids	84. %	1		N/A	SM2540G	WG146313	12-JUL-14 14:44:18	SM2540G	11-JUL-14	

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Raw Data Section

TOTAL SOLIDS BATCH REPORT
Jul 12 2014, 03:15 pm
Batch: WG146313

Sample	Matrix	Type	Batch	Prep Date	Tare	Initial	Final	by	Date	Raw TS	Rep TS	Recovery	RPD
SH4901-1	SL	SAMP	WG146313	11-JUL-14	1.3327 g	5.9657 g	5.9168 g	CB	12-JUL-14	98.9440	99. %		
SH4901-2	SL	SAMP	WG146313	11-JUL-14	1.3397 g	5.092 g	5.062 g	CB	12-JUL-14	99.2000	99. %		
SH4901-3	SL	SAMP	WG146313	11-JUL-14	1.3343 g	9.0706 g	9.0065 g	CB	12-JUL-14	99.1710	99. %		
SH4901-5	SL	SAMP	WG146313	11-JUL-14	1.3473 g	15.0735 g	9.3021 g	CB	12-JUL-14	57.9530	58. %		
SH4901-7	SL	SAMP	WG146313	11-JUL-14	1 g	5 g	5 g	CB	12-JUL-14	100.0000	100 %		
SH4986-1	SL	SAMP	WG146313	11-JUL-14	1.3447 g	27.2748 g	22.8487 g	CB	12-JUL-14	82.9310	83. %		
SH4986-2	SL	SAMP	WG146313	11-JUL-14	1.3455 g	21.3982 g	17.8386 g	CB	12-JUL-14	82.2490	82. %		
SH4986-3	SL	SAMP	WG146313	11-JUL-14	1.3481 g	21.9446 g	18.5675 g	CB	12-JUL-14	83.6040	84. %		
SH4986-4	SL	SAMP	WG146313	11-JUL-14	1.3309 g	32.0679 g	27.9519 g	CB	12-JUL-14	86.6090	87. %		
SH4986-5	SL	SAMP	WG146313	11-JUL-14	1.3385 g	30.6547 g	25.4378 g	CB	12-JUL-14	82.2050	82. %		
SH4986-6	SL	SAMP	WG146313	11-JUL-14	1.3223 g	15.1699 g	12.0474 g	CB	12-JUL-14	77.4510	77. %		
SH4986-7	SL	SAMP	WG146313	11-JUL-14	1.3395 g	15.4743 g	13.6736 g	CB	12-JUL-14	87.2600	87. %		
SH4986-8	SL	SAMP	WG146313	11-JUL-14	1.349 g	24.2555 g	20.5262 g	CB	12-JUL-14	83.7190	84. %		
SH5073-2	SL	SAMP	WG146313	11-JUL-14	1.3299 g	11.4409 g	2.3499 g	CB	12-JUL-14	10.0880	10. %		
SH5073-3	SL	SAMP	WG146313	11-JUL-14	1.3312 g	12.1179 g	2.3222 g	CB	12-JUL-14	9.1870	9.2 %		
SH5073-4	SL	SAMP	WG146313	11-JUL-14	1.3219 g	9.9784 g	1.9358 g	CB	12-JUL-14	7.0920	7.1 %		
SH5074-1	SL	SAMP	WG146313	11-JUL-14	1.3302 g	14.1359 g	5.1255 g	CB	12-JUL-14	29.6380	30. %		
SH5074-2	SL	SAMP	WG146313	11-JUL-14	1.3311 g	7.6663 g	3.6416 g	CB	12-JUL-14	36.4710	36. %		
SH5074-3	SL	SAMP	WG146313	11-JUL-14	1.3317 g	14.2872 g	12.1318 g	CB	12-JUL-14	83.3630	83. %		
SH5074-4	SL	SAMP	WG146313	11-JUL-14	1.3292 g	8.989 g	7.504 g	CB	12-JUL-14	80.6130	81. %		
WG146313-1	SL	MBLANK	WG146313	11-JUL-14	1.3302 g	1.8082 g	1.3301 g	CB	12-JUL-14	-0.0210	1 %		
WG146313-2	SL	LCS	WG146313	11-JUL-14	1.3473 g	7.582 g	7.1148 g	CB	12-JUL-14	92.5060	92. %	103	
WG146313-3	SL	DUP	WG146313	11-JUL-14	1.3276 g	16.434 g	13.989 g	CB	12-JUL-14	83.8150	84. %		1
WG146313-4	SL	DUP	WG146313	11-JUL-14	1.3281 g	8.2724 g	6.2766 g	CB	12-JUL-14	71.2600	71. %		12

Comments:

SH4986-2	NAPR-W67-SB09RP-0507
SH4986-8	MS/MSD
SH5074-1	NTC-NYCDEP-SED-SPLIT-19
SH5074-2	NTC-NYCDEP-SED-SPLIT-20
SH5074-3	NTC-NYCDEP-SED-SPLIT-21; MS/DUP on metals and cyanide. DUP on Black Carbon, TS, pH. MS/MSD on Ammonia, TKN, N+N and Total P. Can be moved to another sample if needed.
SH5074-4	NTC-NYCDEP-SED-SPLIT-22; MS/MSD on DORO and SVOC;MS/DUP on TOC. Can be moved to another sample if needed.
WG146313-1	SH4986-1
WG146313-2	SH4986-1
WG146313-3	SH4986-1
WG146313-4	SH5074-4

Entered by: CB Date: 7/12/14 Accepted by: [signature] Date: 07/13/14

Katahdin Analytical Services 5000017

KATAHDIN ANALYTICAL SERVICES, INC.

TOTAL SOLIDS: ASTM D2216 - PQL: 0.10%				TOTAL VOLATILE SOLIDS: SM2540 G / E160.4 - PQL 0.10%	
ANALYST IN: ZS	TS ANALYST OUT: CB			TVS ANALYST OUT:	Balance Calibrated?
DATE IN: 7.11.14	TS DATE OUT: 7/12/14			TVS DATE OUT:	Y / N
TIME IN: 06:22	TS TIME OUT: 1300			TVS TIME OUT:	In: YES
TEMP IN: 103°C	TS TEMP OUT: 101°			TVS TEMP OUT:	Out (TS):
Oven ID:	Muffle Oven ID: 030807 (assigned)			BALANCE ID: OHAUS - SN: 112401631	Out (TVS):

SAMPLE ID	DISH ID	DISH WT (g)	DISH WET WT (g)	DISH DRY WT (g)	DISH/ASH WT (g)	TIME
Blank	21C					
LCS	22C					
SH4986-1	1C					
-1 Dup	23C					
-2	2C					
-3	3C					
-4	4C					
-5	5C					
-6	6C					
-7	7C					
-8	8C					
SH5073-2	9C					
-3	10C					
-4	11C					
SH5074-1	12C					
-2	13C					
-3	14C					
-4	15C					
-4 Dup	24C					
			ZS 7.11.14			

CHECKED BY: [illegible] DATE: 07/13/14

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WL-009 - Revision 3 - 06/04/2014

QAWL737

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Katahdin Analytical Services 5000018

KATAHDIN ANALYTICAL SERVICES, INC.

TOTAL SOLIDS: ASTM D2216 - PQL: 0.10%		TOTAL VOLATILE SOLIDS: SM2540 G / E160.4 - PQL 0.10%	
ANALYST IN: ZS	TS ANALYST OUT: CB	TVS ANALYST OUT:	Balance Calibrated?
DATE IN: 7·11·14	TS DATE OUT: 7/12/14	TVS DATE OUT:	Y / N
TIME IN: 17:54	TS TIME OUT: 13:00	TVS TIME OUT:	In: Yes
TEMP IN: 103°C	TS TEMP OUT: 101°	TVS TEMP OUT:	Out (TS): Y
Oven ID: 107N0042	Muffle Oven ID: 030807 (assigned)	BALANCE ID: OHAUS - SN: 112401631	Out (TVS):

SAMPLE ID	DISH ID	DISH WT (g)	DISH WET WT (g)	DISH DRY WT (g)	DISH/ASH WT (g)	TIME
SH4901-1	16C					
-2	17C					
-3	18C					
-5	19C					
-7	20C	TB 1	5	5		

This page is a continuation of the previous page (#46).

CHECKED BY: [signature] DATE: 07/13/14

WL-009 - Revision 3 - 06/04/2014

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Katahdin Analytical Services 5000019

Appendix E
Data Validation Summary Reports

DataQual
Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

August 26, 2014
SDG#s SH4986 & SH0547, Katahdin Laboratory
Naval Activity Puerto Rico – SWMU67

Dear Mr. Zamboni,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG #'s SH4986 & SH0547. The data validation was performed in accordance with the SW-846 method 6020A for the metal analyte cobalt only, the Region II Standard Operating Procedure for ICP-MS Data Validation (HW-2b Revision 15) and professional judgment. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	Co by 6020A
NAPR-W67-SB09-0507	SH0547-001	soil	X
NAPR-W67-SB09-0507MS	SH0547-001MS	soil	X
NAPR-W67-SB09-0507MSD	SH0547-001MSD	soil	X
NAPR-W67-SB09P-0507	SH0547-002	soil	X
APR-W67-EB01-012414	SH0547-003	water	X
NAPR-W67-SB09R-0507	SH4986-001	soil	X
NAPR-W67-SB09RP-0507	SH4986-002	soil	X
NAPR-W67-SB10-0507	SH4986-003	soil	X
NAPR-W67-SB11-0507	SH4986-004	soil	X
NAPR-W67-SB12-0507	SH4986-005	soil	X
NAPR-W67-SB12-0709	SH4986-006	soil	X
NAPR-W67-SB13-0507	SH4986-007	soil	X
NAPR-W67-SB14-0507	SH4986-008	soil	X
NAPR-W67-SB14-0507MS	SH4986-008MS	soil	X
NAPR-W67-SB14-0507MSD	SH4986-008MSD	soil	X
NAPR-W67-EB01-070314	SH4986-009	water	X

The following quality control samples were provided with this SDG: sample NAPR-W67-EB01-012414 – rinse blank and sample NAPR-W67-SB09RP-0507-field duplicate of sample NAPR-W67-SB09R-0507.

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Cobalt by 6020A

No qualifications were required in the samples in this SDG.

Specific Evaluation of Data

Data Completeness

The data packages were received intact and complete. No resubmissions were required.

Technical Holding Times

According to chain of custody records, sampling was performed on 1/24/14 & 7/3/14. Samples were received at Katahdin on 1/25/14 & 7/8/14. All sample preparation and analysis was performed within Region II and method holding time requirements.

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

Cobalt by 6020A

Sample ID	Analyte	Results	Q flag	Q Code
No qualifications were required				

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified. estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL. result is reported as non-detect at the RL* or 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.

* 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.

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 RL* or 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.

* 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

General Abbreviations

RL/LOD	reporting limit
PQL	practical quantitation limit
IDL	instrument detection limit
MDL	method detection limit
CRQL/LOQ	contract required quantitation limit
+	positive result
-	non-detect result

QUALIFIER CODE REFERENCE

Qualifier	Description
TN	Tune
BSL	Blank Spike/LCS - High Recovery
BSH	Blank Spike/LCS - Low Recovery
BD	Blank Spike/Blank Spike Duplicate (LCS/LCSD) Precision
BRL	Below Reporting Limit
ISL	Internal Standard - Low Recovery
ISH	Internal Standard - High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate - Low Recovery
MSH	Matrix Spike and/or Matrix Spike Duplicate - High Recovery
MI	Matrix interference obscuring the raw data
MDP	Matrix Spike/Matrix Spike Duplicate Precision
2S	Second Source - Bad reproducibility between tandem detectors
SSL	Spiked Surrogate - Low Recovery
SSH	Spiked Surrogate - High Recovery
SD	Serial Dilution Reproducibility
ICL	Initial Calibration - Low Relative Response Factors (RRF)
ICH	Initial Calibration - High Relative Response Factors (RRF)
ICB	Initial Calibration - Bad Linearity or Curve Function
CCL	Continuing Calibration - Low Recovery or %Difference
CCH	Continuing Calibration - High Recovery or %Difference
LD	Lab Duplicate Reproducibility
HT	Holding Time
PD	Pesticide Degradation
2C	Second Column - Poor Dual Column Reproducibility
LR	Concentration Exceeds Linear Range
BL	Blank Contamination
RE	Redundant Result - due to Re-analysis or Re-extraction
DL	Redundant Result - due to Dilution
FD	Field Duplicate
OT	Other - explained in data validation report
%SOL	High moisture content

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB09R-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.9 **Lab Sample ID:** SH4986-001

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	24.8			MS	5	0.072	0.0039	0.022

JPC
8/25/14

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-SB09RP-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-002

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	25.9			MS	5	0.069	0.0038	0.021

JC 8/25/14

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB10-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.6 **Lab Sample ID:** SH4986-003

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	18.8			MS	5	0.066	0.0036	0.020

JLC 8/25/14

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB11-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 86.6 **Lab Sample ID:** SH4986-004

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	26.1			MS	5	0.082	0.0045	0.025

gfc
p.25 14

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 82.2 **Lab Sample ID:** SH4986-005

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	36.2			MS	5	0.072	0.0039	0.021

JAC 7/25/14

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB12-0709

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 77.4 **Lab Sample ID:** SH4986-006

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	ADJUSTED MDL	ADJUSTED LOD
7440-48-4	COBALT, TOTAL	29.3			MS	5	0.076	0.0042	0.023

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB13-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 87.3 **Lab Sample ID:** SH4986-007

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	36.5			MS	5	0.064	0.0035	0.019

JSC 8/25/14

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB14-0507

Matrix: SOIL **SDG Name:** SH4986

Percent Solids: 83.7 **Lab Sample ID:** SH4986-008

Concentration Units : mg/Kg drywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	25.5		K	MS	5	0.062	0.0034	0.019

JAC 8-25-14

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-070314

Matrix: WATER **SDG Name:** SH4986

Percent Solids: 0.00 **Lab Sample ID:** SH4986-009

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	0.30	U		MS	5	1.0	0.060	0.30

JBC 8-25-14

Comments:

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB09-0507

Matrix: SOIL **SDG Name:** SH0547

Percent Solids: 87.7 **Lab Sample ID:** SH0547-001

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	7.4			MS	5	0.086	0.004	0.026

8/25/14

Comments:

FORM I - IN

1

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** NAPR-W67-SB09P-0507

Matrix: SOIL **SDG Name:** SH0547

Percent Solids: 88.2 **Lab Sample ID:** SH0547-002

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	7.2			MS	5	0.063	0.003	0.019

8/25/14

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** APR-W67-EB01-012414

Matrix: WATER **SDG Name:** SH0547

Percent Solids: 0.00 **Lab Sample ID:** SH0547-003

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7440-48-4	COBALT, TOTAL	0.30	U		MS	5	1.0	0.05	0.30

JAC 8/25/14

Comments:

FORM I - IN

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
CH2MHILL
CTO JM08 NAPR SWMU 67
SH4986

Sample Receipt

The following samples were received on July 08, 2014 and were logged in under Katahdin Analytical Services work order number SH4986 for a hardcopy due date of August 01, 2014.

KATAHDIN Sample No.	CH2MHILL Sample Identification
SH4986-1	NAPR-W67-SB09R-0507
SH4986-2	NAPR-W67-SB09RP-0507
SH4986-3	NAPR-W67-SB10-0507
SH4986-4	NAPR-W67-SB11-0507
SH4986-5	NAPR-W67-SB12-0507
SH4986-6	NAPR-W67-SB12-0709
SH4986-7	NAPR-W67-SB13-0507
SH4986-8	NAPR-W67-SB14-0507
SH4986-9	NAPR-W67-EB01-070314

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Jennifer Obrin**. This narrative is an integral part of the Report of Analysis.

Some of the client IDs on the Chain of Custody exceeds the 19-character limit of the Katahdin Analytical Information Management System. Therefore, the first character "N" in the client ID for samples SH4986-2 and 9 were omitted on all forms.

Metals Analysis

The samples of Katahdin Work Order SH4986 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods" SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Aqueous-matrix Katahdin Sample Number SH4986 –9 was digested for ICP-MS analysis on 06/09/14 (QC Batch HG09IMW2) in accordance with USEPA Method 3010A. Katahdin Sample Number SH4986 -9 was prepared with duplicate matrix-spiked aliquots.

Solid-matrix Katahdin Sample Numbers SH4986 –(1-8) were digested for ICP-MS analysis on 06/15/14 (QC Batch HG15IMS1) in accordance with USEPA Method 3010A. Katahdin Sample Number SH4986 - 8 was prepared with duplicate matrix-spiked aliquots.

ICP-MS analyses of Katahdin Work Order SH4986 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020A. Results for all standards and samples are reported using the mean of 3 replicate measurements. All sample digestates were diluted by a factor of 5 during analysis to reduce mass interferences from chlorine, which is present in the digestates from the hydrochloric acid used in digesting the samples. All samples were analyzed within holding times and all analytical run QC criteria were met, with the following exception:

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium
Bismuth	Lead, Thallium

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of cobalt in the matrix-spiked aliquots of Katahdin Sample Numbers SH4986 –(8 and 9) are within the project acceptance criteria (80% - 120% recovery of the added element, if the native concentration is less than four times the amount added).

The matrix-spike duplicate analysis of Katahdin Sample Numbers SH4986 –(8 and 9) are within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for cobalt.

The serial dilution analysis of Katahdin Sample Numbers SH4986 –(8 and 9) are within the project acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the LOQ) for cobalt.

The measured recovery of cobalt in the post-digestion spike of Katahdin Sample Number SH4986 –8 is outside the acceptance criteria (75% - 125% recovery of the added element). For cobalt this may be attributed to the native concentration in the sample being significantly higher than the spike amount added.

The measured recovery of cobalt in the post-digestion spike of Katahdin Sample Number SH4986 –9 is within the acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added).

Reporting of Metals Results

Per client request, analytical results for client samples on Form I and preparation blanks on Form IIIP have been reported using the laboratory's limits of detection (LOD). All results were evaluated down to the laboratory's method detection limits (MDLs). Results that fall between the MDL and the LOQ are flagged with "J" in the C-qualifier column, and the measured concentration appears in the concentration column. Results that are less than the MDL are flagged with "U" in the C-qualifier column, and the LOD is listed in the concentration column. These LOQs, MDLs, and LODs have been adjusted for each sample based on the sample amounts used in preparation and analysis.

Analytical results on Forms VA, VD, VII, and IX for client samples, matrix QC samples (duplicates and matrix spikes), and laboratory control samples have been reported down to the laboratory's method detection limits (MDLs). Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column, and the measured concentration is listed in the concentration column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, LODs, MDLs, and LOQs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of Work Order SH4986 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Standard Methods for the Examination of Water and Wastewater", 15th, 16th, 17th, 18th, 19th, and 20th editions, 1980, 1985, 1989, 1992, 1995, 1999. APHA-AWWA-WPCF.

All analyses were performed within analytical holding times. All quality control criteria were met.

Katahdin
ANALYTICAL SERVICES

nelac

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
073114

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc. **Sample Receipt Condition Report**

Client: CH2MHill		KAS PM: JO		Sampled By: Client	
Project:		KIMS Entry By: GN		Delivered By: Fed Ex	
KAS Work Order#: 5H4986		KIMS Review By:		Received By: GN	
SDG #:	Cooler: 1 of 1			Date/Time Rec.: 7-8-14/09:10	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 5.9
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included			✓	
7. Trip Blank present in cooler?		✓		✓	
8. Proper sample containers and volume?	✓	✓			
9. Samples within hold time upon receipt?	✓	✓			
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

Katahdin ANALYTICAL SERVICES
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page ____ of ____

Client: CH2M HILL
Contact: MIKE ZAMBONI
Phone #: (703) 376 5301
Fax #: ( )

Address:
City:
State:
Zip Code:

Purchase Order #:
Proj. Name / No.: Sumu 67 / 492993.71. FI.FK
Katahdin Quote #:

Bill (if different than above):
Address:

Sampler (Print / Sign): RONNY FIELDS /
Copies To:

LAB USE ONLY
WORK ORDER #: 5H4986
KATAHDIN PROJECT NUMBER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C ____ ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	SW-846 6020A (COBALT ONLY)	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N	Filt. ☐Y ☐N
	NAPR-W67-SB09R-0507	7/3/14 / 0845	SOIL	1	X										
	NAPR-W67-SB09RP-0507	7/3/14 / 0850	SOIL	1	X										
	NAPR-W67-SB10-0507	7/3/14 / 0855	SOIL	1	X										
	NAPR-W67-SB11-0507	7/3/14 / 0905	SOIL	1	X										
	NAPR-W67-SB12-0507	7/3/14 / 0915	SOIL	1	X										
	NAPR-W67-SB12-0709	7/3/14 / 0920	SOIL	1	X										
	NAPR-W67-SB13-0507	7/3/14 / 0930	SOIL	1	X										
	NAPR-W67-SB14-0507	7/3/14 / 0940	SOIL	1	X										
	NAPR-W67-SB14-0507MS	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE)									
	NAPR-W67-SB14-0507SD	7/3/14 / 0940	SOIL	1	X	(MATRIX SPIKE DUPLICATE)									
	NAPR-W67-EB02-070314	7/3/14 / 1000	QC	1	X	(EQUIPMENT BLANK)									
		/													
		/													
		/													
		/													
		/													

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	7/7/14 0905				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 08, 2014
11:04 AM

Login Number: SH4986

Account: CH2MVA001 Web
CH2MHill

Project: CH2MNAPR-CTO-JM08
CTO JM08 NAPR SWMU 67

Quote/Incoming: CH2MNAPR-CTO-JM

Primary Report Address:
Michael Zamboni
CH2MHill
15010 Conference Center Drive
Suite 200
Chantilly,VA 20151
michael.zamboni@ch2m.com

Primary Invoice Address:
Accounts Payable
CH2M Hill, Inc.
PO Box 241329

Denver,CO 80224

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	DoD QSM V4.2 with DoD limits. ND to LOD "J" flag between MDL and LOQ SW6020A Client charge is for PR chemist certification
CHECK NO.	
CLIENT PO#	No PO required; 475153.67.PP FR
CLIENT PROJECT MANAGE	Linda Saksvig
CONTRACT	N62470-11-D-8012
COOLER TEMPERATURE	5.9
DELIVERY SERVICES	Fedex
EDD FORMAT	KAS106QC-XLS
LOGIN INIT ALS	GN
PM	JO
PROJECT NAME	CTO JM08 NAPR SWMU 67
QC LEVEL	IV
REGULATORY LIST	
REPORT INSTRUCTIONS	Data summary needs all forms Send HC, CD and invoice copy to Mike. Email Report to PR Chemist Maritza Vazquez (chemboy@maritzavazquez.com) for certification.

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH4986-1	NAPR-W67-SB09R-0507	03-JUL-14 08:45	SDG 01-08-JUL-14 SDG STATUS			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Service	S	CLIENT-CHARGE				
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-2	APR-W67-SB09RP-0507	03-JUL-14 08:50	08-JUL-14		01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			NAPR-W67-SB09RP-0507
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-3	NAPR-W67-SB10-0507	03-JUL-14 08:55	08-JUL-14		01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-4	NAPR-W67-SB11-0507	03-JUL-14 09:05	08-JUL-14		01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-5	NAPR-W67-SB12-0507	03-JUL-14 09:15	08-JUL-14		01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-6	NAPR-W67-SB12-0709	03-JUL-14 09:20	08-JUL-14		01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

07.08.14

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 08, 2014
11:04 AM

Login Number: SH4986

Quote/Incoming: CH2MNAPR-CTO-JM

Account: CH2MVA001 Web
CH2MHill

Project: CH2MNAPR-CTO-JM08
CTO JM08 NAPR SWMU 67

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH4986-7	NAPR-W67-SB13-0507	03-JUL-14 09:30	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	30-DEC-14			
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-8	NAPR-W67-SB14-0507	03-JUL-14 09:40	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS PREP	30-DEC-14			MS/MSD
Solid	S	SW6020-COBALT	30-DEC-14	4oz Glass		
Solid	S	TS	02-AUG-14			

SH4986-9	APR-W67-EB01-070314	03-JUL-14 10:00	08-JUL-14			01-AUG-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SW3010MS PREP	30-DEC-14	250mL Plastic+HNO3		NAPR-W67-EB01-070314
Aqueous	S	SW6020-COBALT	30-DEC-14	250mL Plastic+HNO3		

Total Samples: *9* ***Total Analyses:*** *27*

JP 07.08.14

027

Katahdin
ANALYTICAL SERVICES

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
CH2MHILL
CTO JM08 NAPR SWMU 67
SH0547

Sample Receipt

The following samples were received on January 25, 2014 and were logged in under Katahdin Analytical Services work order number SH0547 for a hardcopy due date of February 19, 2014.

KATAHDIN Sample No.	CH2MHILL Sample Identification
SH0547-1	NAPR-W67-SB09-0507
SH0547-2	NAPR-W67-SB09P-0507
SH0547-3	NAPR-W67-EB01-012414

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

One of the client IDs on the Chain of Custody exceeds the 19-character limit of the Katahdin Analytical Information Management System. Therefore, the first character "N" in the client ID for sample SH0547-1 was omitted on all forms.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Jennifer Obrin**. This narrative is an integral part of the Report of Analysis.

Metals Analysis

The samples of Work Order SH0547 were prepared and analyzed for metals in accordance with the "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods." SW-846. 2nd edition, 1982 (revised 1984), 3rd edition, 1986, and Updates I, II, IIA, III, IIIA and IIIB 1996, 1998 & 2004, Office of Solid Waste and Emergency Response, U.S. EPA.

Inductively-Coupled Plasma Mass Spectrometric Analysis (ICP-MS)

Solid-matrix Katahdin Sample Numbers SH0547-(1 and 2) were digested for ICP-MS analysis on 01/30/14 (QC Batch HA30IMS1) in accordance with USEPA Method 3050B. Katahdin Sample Number SH0547-1 was prepared with duplicate matrix-spiked aliquots.

Aqueous-matrix Katahdin Sample Number SH0547-3 was digested for ICP-MS analysis on 01/30/14 (QC

Batch HA30IMW2) in accordance with USEPA Method 3010A.

ICP-MS analyses of Work Order SH0547 sample digestates were performed using an Agilent 7500 ICP-MS spectrometer in accordance with USEPA Method 6020A. Results for all standards and samples are reported using the mean of 3 replicate measurements. All sample digestates were diluted by a factor of 5 during analysis to reduce mass interferences from chlorine, which is present in the digestates from the hydrochloric acid used in digesting the samples. All samples were analyzed within holding times and all analytical run QC criteria were met.

Internal standard recoveries for ICP-MS analyses can be found in the raw data section of the accompanying data package. The following table indicates which analytes are associated with each internal standard element.

Internal Standard Element	Associated Analytes
Lithium	Beryllium
Scandium	Sodium, Magnesium, Aluminum, Potassium, Calcium
Germanium	Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Arsenic, Selenium, Silver, Cadmium
Terbium	Antimony, Barium
Bismuth	Lead, Thallium

Instrument tuning information can also be found in the raw data section in the report labeled "6020 QC Tune Report". The relative standard deviation was determined from 4 replicate measurements. The peak width was measured at 10% of the peak height.

Matrix QC Summary

The measured recovery of cobalt in the matrix-spiked aliquots of Katahdin Sample Number SH0547 -1 are within the project acceptance criteria (80% - 120% recovery of the added element, if the native concentration is less than four times the amount added).

The measured recovery of cobalt in the post-digestion spike of Katahdin Sample Number SH0547 -1 is within the project acceptance criteria (75% - 125% recovery of the added element, if the native concentration is less than four times the amount added).

The matrix-spike duplicate analysis of Katahdin Sample Number SH0547 -1 is within the laboratory's acceptance limit (<20% relative difference between duplicate matrix-spiked aliquots) for cobalt.

The serial dilution analysis of Katahdin Sample Number SH0547 -1 is within the project acceptance limit (<10% relative percent difference, if the concentration in the original sample is greater than 50 times the LOQ) for cobalt.

Reporting of Metals Results

Per client request, analytical results for client samples on Form I and preparation blanks on Form IIIP have been reported using the laboratory's limits of detection (LOD). All results were evaluated down to the laboratory's method detection limits (MDLs). Results that fall between the MDL and the LOQ are

flagged with "J" in the C-qualifier column, and the measured concentration appears in the concentration column. Results that are less than the MDL are flagged with "U" in the C-qualifier column, and the LOD is listed in the concentration column. These LOQs, MDLs and LODs have been adjusted for each sample based on the sample amounts used in preparation and analysis.

Analytical results on Forms VA, VD, VII, and IX for client samples, matrix QC samples (duplicates and matrix spikes), and laboratory control samples have been reported down to the laboratory's method detection limits (MDLs). Analytical results that are below the MDLs are flagged with "U" in the C-qualifier column, and the measured concentration is listed in the concentration column.

Analytical results for instrument run QC samples (ICVs, ICBs, etc.) have been reported down to the laboratory's instrument detection limits (IDLs).

IDLs, LODs, MDLs, and LOQs are listed on Form 10 of the accompanying data package.

Wet Chemistry Analysis

The samples of Work Order SH0547 were analyzed in accordance with the specific methods listed on the Report of Analysis.

Analyses for total solids were performed according to "Standard Methods for the Examination of Water and Wastewater", 15th, 16th, 17th, 18th, 19th, and 20th editions, 1980, 1985, 1989, 1992, 1995, 1999. APHA-AWWA-WPCF.

All Wet Chemistry results were evaluated to Katahdin Analytical Services' Method Detection Limits (MDL). Measured concentrations that fall between the MDL and Katahdin's Limit of Quantitation (LOQ) are flagged "J". Measured concentrations that are below the MDL are flagged "U" and reported as "U LOD", where "LOD" is the numerical value of the Limit of Detection.

All analyses were performed within analytical holding times. All quality control criteria were met.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
02.13.14

Leslie Dimond
Quality Assurance Officer

Jennifer Obrin

From: Thayer, Valerie [Valerie.Thayer@aecom.com]
Sent: Wednesday, January 29, 2014 4:34 PM
To: Jennifer Obrin
Cc: Vivaudou, Eleanor
Subject: RE: COCs for the samples received 01/25-Bethpage-SH0546 and SH0549

Follow Up Flag: Follow up
Flag Status: Flagged

Sorry for the confusion – it should be 378-380. I checked my field book. Let me know if there is anything more I need to do to correct this.

Val

From: Jennifer Obrin [mailto:jobrin@katahdinlab.com]
Sent: Wednesday, January 29, 2014 2:43 PM
To: Vivaudou, Eleanor; Thayer, Valerie
Subject: RE: COCs for the samples received 01/25-Bethpage-SH0546 and SH0549

Eleanor,

I have checked the vials and the chain. They both say 278-280.

Jen

From: Vivaudou, Eleanor [mailto:Eleanor.Vivaudou@aecom.com]
Sent: Wednesday, January 29, 2014 2:19 PM
To: Thayer, Valerie
Cc: Jennifer Obrin
Subject: RE: COCs for the samples received 01/25-Bethpage-SH0546 and SH0549

Hello

I checked out the coc for SH0546. There is a sample VPB 146-012114-278-280 should that be VPB146-012114-378-380? There already is a sample for 278-280 on 1/16 on coc SH0427.

Eleanor

031

From: Jennifer Obrin [mailto:jobrin@katahdinlab.com]
Sent: Monday, January 27, 2014 12:13 PM
To: 'Brian Caldwell'; Vivaudou, Eleanor; Purdy, Richard; Thayer, Valerie; 'Michael Zobel'
Subject: COCs for the samples received 01/25-Bethpage-SH0546 and SH0549

Good Afternoon,

Please find attached the COCs for the samples received 01/25 for the project Bethpage under the work orders SH0546 and SH0549. Please let me know if you have any questions.

Have a wonderful day!

Jennifer Obrin
Federal Programs Project Manager
Katahdin Analytical Services
A Woman-Owned Small Business Enterprise
DoD ELAP Accredited
600 Technology Way
Scarborough, Maine 04074
Direct - 207.874.2400 x17
Cell - 207.333.7469
Fax - 207.775.4029

PLEASE NOTE: This message, including any attachments, may include privileged, confidential and/or inside information. Any distribution or use of this communication by anyone other than the intended recipient is strictly prohibited and may be unlawful. If you are not the intended recipient, please notify the sender by replying to this message and then delete it from your system.

No virus found in this message.
Checked by AVG - www.avg.com
Version: 2014.0.4259 / Virus Database: 3681/7038 - Release Date: 01/27/14

No virus found in this message.
Checked by AVG - www.avg.com
Version: 2014.0.4259 / Virus Database: 3684/7044 - Release Date: 01/29/14

Katahdin Analytical Services, Inc. **Sample Receipt Condition Report**

Client: CH2MHill		KAS PM: Jo		Sampled By: Client	
Project:		KIMS Entry By: GN		Delivered By: FedEx	
KAS Work Order#: SH0547		KIMS Review By:		Received By: GN to JJ	
SDG #:	Cooler: 1 of 1			Date/Time Rec.: 12-5-14/10.30	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?	✓				
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 2.2
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: ~~Received in airtight~~ container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. 45684

Report to: PLEASE PRINT
Company Name: CH2M HILL Phone: 703-376-5301
Address: WDC
Fax: —
Attn: Mike Zamboni SH0547

Invoice to: PLEASE PRINT
Company Name: See Contract Phone:
Address:
Fax:
Attn:

Project Name/Number: SWMU-67 475153.67.FI.FK
Purchase Order Number: See Contract
Sampler (Print): Pat Murphy
Sampler (Signature):

Date Shipped: 1/24/14
Carrier: FED-EX
Waybill No.: ~~8014318286~~
Comments: 8014318286

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Matrix: Sed.	Matrix: Soil	Analysis Requested/Method Number: Metals Cobalt only											Comments
NAPR-W67-SB09-0507	SWMU-67	1/24/14	1100	AST	1			✓	1											
NAPR-W67-SB09-0507MS	SWMU-67	1/24/14	1100	AST	1			✓	1											
NAPR-W67-SB09-0507SD	SWMU-67	1/24/14	1100	AST	1			✓	1											
NAPR-W67-SB09P0507	SWMU-67	1/24/14	1110	AST	1			✓	1											
NAPR-W67-EB01-012414	SWMU-67	1/24/14	1130	AST	1	✓			1											HNO_3

Shuttle Temperature:

Turnaround Requested: Check one
☑ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Pat Murphy	1/24/14	1230	1-25-14				
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

See reverse side for Container Preservative and Sampling Information

34

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Feb. 07, 2014
07:44 AM

Login Number: SH0547

Account: CH2MVA001 Web
CH2MHill

Project: CH2MNAPR-CTO-JM08
CTO JM08 NAPR SWMU 67

Quote/Incoming: CH2MNAPR-CTO-JM

Primary Report Address:
Michael Zamboni
CH2MHill
15010 Conference Center Drive
Suite 200
Chantilly,VA 20151
michael.zamboni@ch2m.com

Primary Invoice Address:
Accounts Payable
CH2M Hill, Inc.
PO Box 241329

Denver,CO 80224

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	DoD QSM V4.2 with DoD limits. ND to LOD "J" flag between MDL and LOQ. SW6020A. Client charge is for PR chemist certification.
CHECK NO.	
CLIENT PO#	No PO required; 475153.67 PP.FR
CLIENT PROJECT MANAGE	Linda Saksvig
CONTRACT	N62470-11-D-8012
COOLER TEMPERATURE	2.2
DELIVERY SERVICES	Fedex
EDD FORMAT	KAS106QC-XLS
LOGIN INITIALS	GN
PM	JO
PROJECT NAME	CTO JM08 NAPR SWMU 67
QC LEVEL	IV
REGULATORY LIST	
REPORT INSTRUCTIONS	Data summary needs all forms. Send HC, CO and invoice copy to Mike. Email PDF to PR Chemist Maritza Vazquez (chemb@maritzavazquez.com) for certification.

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH0547-1	NAPR-W67-SB09-0507	24-JAN-14 11:00	25-JAN-14			19-FEB-14	

SDG ID
SDG STATUS

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Service	S	CLIENT-CHARGE				MS/MSD
Solid	S	SW3050MS-PREP	23-JUL-14			
Solid	S	SW6020-COBALT	23-JUL-14	4oz Glass		
Solid	S	TS	23-FEB-14			

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH0547-2	NAPR-W67-SB09P-0507	24-JAN-14 11:10	25-JAN-14			19-FEB-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Solid	S	SW3050MS-PREP	23-JUL-14			
Solid	S	SW6020-COBALT	23-JUL-14	4oz Glass		
Solid	S	TS	23-FEB-14			

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH0547-3	APR-W67-EB01-012414	24-JAN-14 11:30	25-JAN-14			19-FEB-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SW3010MS-PREP	23-JUL-14	250mL Plastic+HNO3		NAPR-W67-EB01-012414
Aqueous	S	SW6020-COBALT	23-JUL-14	250mL Plastic+HNO3		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SH0547-4	FEDEX SHIPPING	24-JAN-14 00:00	25-JAN-14			19-FEB-14	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Service	S	SHIPPING				FedEx charge for the cooler that was not picked up and shipped back to Katahdin.

Total Samples: **4** ***Total Analyses:*** **10**

02 07 14

P35

This SDG contains analysis for cobalt (Co) only using method SW-846 6020A – ICP-MS. The site is in Region II. Region II guidance was used in the validation of these SDGs. The data package was presented in completion, using CLP type forms.

HOLDING TIMES

Licorr JRC 8/26/14

Sampling Date: 1/24/14 & 7/8/14 HT – 6 months
Received Date: 1/25/14 & 7/8/14
Prep. Dates: 1/30/14, 7/9/14 & 7/15/14
Analysis Dates: 1/31/14, 2/4/14, 7/23/14 & 7/28/14

All holding times requirements were met. COC records are present, containing necessary signatures indicating change of custody between sampler and laboratory. No receipt condition logs were present. No qualifications were required.

CALIBRATIONS

The proper calibration procedures were followed for the cobalt analyses based on the method used by the laboratory. Mass calibration tune criteria were met. All associated ICV/CCV criteria were met. The CRI check standards were analyzed and all criteria were met. ICSA/ICSAB criteria were met. Raw data was verified.

BLANK SUMMARY

Blank qualification guidelines:

- No action is taken if an analyte is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the criteria.
- Apply the same data validation guidelines to any associated calibration, preparation, and field QC blanks and all associated samples.
- Qualification/Action codes:

No Action - The sample result is greater than the CRDL and greater than five times (5X) the blank value.
U - The sample result is less than five times (5X) the blank value.

Blank Contamination and Qualification Summaries

Blank ID	Analyte	Concentration	Action Level	Q Flag
No contamination was reported in associated blanks including method blanks, calibration blanks and rinse blanks.	cobalt	NA		NA

MATRIX SPIKE/DUPLICATE SUMMARY

Two MS/MSD pairs were analyzed with these samples. The MS/MSD pair of sample NAPR-W67-SB09-0507 exhibited acceptable recoveries and RPD. The MS/MSD pair of sample NAPR-W67-SB14-0507 exhibited acceptable recoveries and RPD. The PDS spikes analyzed with these spike pairs were non-compliant due to the abundance of the target analyte in the native samples. No qualifications were required in the associated samples.

SERIAL DILUTIONS

The serial dilution analyses exhibited compliant %Ds for the reported analytes.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed only if both results are above the CRDL.

Sample ID:	NAPR-W67-SB09-0507	Duplicate Sample ID:	APR-W67-SB09P-0507
COBALT	7.4/7.2	RPD – 2.7%	
Sample ID:	NAPR-W67-SB09R-0507	Duplicate Sample ID:	APR-W67-SB09RP-0507
COBALT	24.8/25.9	RPD – 4.3%	

Comments: No qualifications were required.

SAMPLE RESULT VERIFICATION

Specific Comments:

Samples exhibited positive results for cobalt. Sample quantitation was verified. LODs and LOQs were appropriately adjusted for extraction amount and %solids. No qualification of the analytical data was required.

LOD Verification

NAPR-W67-SB09R-0507 LOD 0.022 mg/kg

LOD = 0.30 mg/L

$$0.30\ mg/L \cdot \frac{0.10L}{1.7g} \cdot \frac{1}{0.774} = 0.0228\ mg/g$$

Reviewer: A Cleveland Date: 8/26/14

CH2M HILL NAPR SWMU67 METALS CALCULATIONS

SDG SH4986

ICP-MS	
SAMPLE ID	NAPR-W67-SB12-0709
ANALYTE	cobalt
Lab Value CONCENTRATION (mg/Kg)	29.3
AMOUNT FROM RAW DATA (ug/L)	77.19
SAMPLE SIZE (g)	1.7
FINAL VOLUME (L)	0.1
DILUTION FACTOR	5
DRYNESS FACTOR	0.774
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	29.33197

SDG SH0547

ICP-MS	
SAMPLE ID	NAPR-W67-SB09P-0507
ANALYTE	cobalt
Lab Value CONCENTRATION (mg/Kg)	7.2
AMOUNT FROM RAW DATA (ug/L)	22.89
SAMPLE SIZE (g)	1.81
FINAL VOLUME (L)	0.1
DILUTION FACTOR	5
DRYNESS FACTOR	0.882
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	7.16917

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** NAPR-W67-SB14-0507S

Matrix: SOIL | **SDG Name:** SH4986

Percent Solids: 83.7 | **Lab Sample ID:** SH4986-008A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	83.0		81.9		2	53.5	A	75	125	MS

Comments:

No Quals - out due to abundance.

FORM V (Part 2) - IN

5B

POST DIGEST SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** NAPR-W67-SB09-0507S

Matrix: SOIL | **SDG Name:** SH0547

Percent Solids: 87.7 | **Lab Sample ID:** SH0547-001A

Concentration Units : ug/L

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
COBALT, TOTAL	18.5600		17.3700		2	59.5		75	125	MS

Comments: NQ - spike added amt is small compared to the natural conc.

FORM V (Part 2) - IN

040

DataQual

Environmental Services, LLC

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

July 11, 2010

SDG# 1003194, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003194. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB01-00	1003194-17	soil	X	X	X	X	X	X
67SB01-01	1003194-18	soil	X	X	X	X	X	X
67SB01-01D	1003194-19	soil	X	X	X	X	X	X
67SB01-03	1003194-20	soil	X	X	X	X	X	X
67SB05-00	1003194-14	soil	X	X	X	X	X	X
67SB05-01	1003194-15	soil	X	X	X	X	X	X
67SB05-05	1003194-16	soil	X	X	X	X	X	X
67SB07-00	1003194-11	soil	X	X	X	X	X	X
67SB07-01	1003194-12	soil	X	X	X	X	X	X
67SB07-05	1003194-13	soil	X	X	X	X	X	X
67SB08-00	1003194-07	soil	X	X	X	X	X	X
67SB08-00D	1003194-08	soil	X	X	X	X	X	X
67SB08-01	1003194-09	soil	X	X	X	X	X	X
67SB08-05	1003194-10	soil	X	X	X	X	X	X
67SD01	1003194-01	soil	X	X	X	X	X	X
67SD01D	1003194-04	soil	X	X	X	X	X	X
67SD02	1003194-02	soil	X	X	X	X	X	X
67SD03	1003194-03	soil	X	X	X	X	X	X
67SD04	1003194-05	soil	X	X	X	X	X	X
67SD05	1003194-06	soil	X	X	X	X	X	X
67SD01 MS	1003194-01MS	soil	X	X	X	X	X	X
67SD01 MSD	1003194-01MSD	soil	X	X	X	X	X	X

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The following quality control samples were provided with this SDG: sample 67SB01-01D -field duplicate of sample 67SB01-01; sample 67SB08-00D-field duplicate of sample 67SB08-00; and sample 67SD01D-field duplicate of sample 67SD01.

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

VOA

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

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

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

Several samples exhibited non-compliant surrogate recoveries that resulted in qualifications to the data. The samples were re-analyzed with similar results.

Due to non-comparable results in one of the field duplicate pairs, qualifications were added to the data.

SVOA

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

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

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

Two samples exhibited non-compliant internal standard area recoveries that resulted in qualifications to the data. The samples were re-analyzed with less non-compliant recoveries; therefore the re-analysis was used instead of the initial analysis.

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

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Three compounds were also qualified as estimated due to high or low recoveries.

One of the field duplicate pairs did not exhibit comparable results that resulted in qualifications to the data.

GRO

One sample contained 50-90% water that resulted in qualifying the data results as estimated.

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

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

The associated MS/MSD pair of sample 67SD01 exhibited low recoveries for DRO in the MS and MSD. All sediment samples were flagged as estimated J/UJ.

Metals by 6020 & 7471

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

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

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

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

The field duplicate pair of sample 67SB01-01/67SB01-01D exhibited one analyte with a non-compliant RPD greater than 120%. This analyte was rejected based on Region II guidance in the field duplicate pair only.

The field duplicate pair of sample 67SB08-00/67SB08-00D exhibited several analytes with non-compliant RPDs or absolute value results. These analytes were flagged based on Region II guidance in the field duplicate pair only.

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

Tin by 6010B

One sample contained 50-90% water that resulted in the qualification of the data results as estimated.

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

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were required for the SVOA fraction as the reporting limit listed on the Form I for several samples was not reported correctly. The laboratory was contacted and the corrected forms were supplied and used for this report. The laboratory was contacted for clarification of the ICP-MS calculation.

Sample Condition

All Fractions

Sediment sample 67SD05 contained >50% moisture (53%). This required the qualification of all reported results as estimated (J/UJ).

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-24/10 and samples were received at the laboratory 3/24-26/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

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

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

SVOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 3/17/10	2-picoline	22.651	67SD01, 67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	J/UJ
	nitrosomethylethylamine	22.006		
	n-nitrosodiethylamine	21.768		
	n-nitrosopyrrolidine	24.941		
	n-nitrosomorpholine	22.939		
	o-toluidine	22.524		
	n-nitrosopiperidine	24.199		
	p-phenylenediamine	28.824		
	1-naphthylamine	27.268		
	2-naphthylamine	30.303		
	5-nitro-o-toluidine	27.604		
	n-nitrosodiphenylamine	16.397		
	diallate (trans isomer)	23.234		
	4-aminobiphenyl	24.870		
	4-nitroquinoline-1-oxide	19.692		
	methapyrilene	29.063		
	p-dimethylaminoazobenzene	25.398		
	3,3'-dimethylbenzidine	29.792		
	2-acetylaminofluorene	24.074		
	indeno(1,2,3-cd)pyrene	19.789		
	diallate (total)	19.303		
CC full scan 4/13/10	benzyl alcohol	24.38	67SD01	J/UJ
	nitrobenzene	80.51		
	bis(2-chloroethoxy)methane	25.07		
	hexachloropropene	24.50		
	n-nitroso-di-n-butylamine	-29.67		
	1,4-napthaquinone	21.84		
	4-nitrophenol	-36.27		
	pentachloronitrobenzene	26.66		
	dinoseb	20.76		
CC full scan 4/14/10	nitrobenzene	72.11	67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	J/UJ
	hexachloropropene	20.34		
	n-nitroso-di-n-butylamine	-46.64		
	7,12-dimethylbenz(a)anthracene	-21.45		
	dibenzo(a,h)anthracene	25.02		
	benzo(g,h,i)perylene	32.78		
IC full scan 4/16/10	2,6-dichlorophenol	19.314	67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	J/UJ
	hexachloropropene	21.849		
	1,4-napthoquinone	20.128		
	diallate (trans isomer)	19.278		
	4-nitroquinoline-1-oxide	23.521		
	7,12-dimethylbenz(a)anthracene	16.318		
	benzo(k)fluoranthene	29.966		

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC-full scan 4/23/10	pyridine methyl methanesulfonate aniline 2-chlorophenol benzyl alcohol n-nitroso-di-n-propylamine methapyrilene benzo(b)fluoranthene diallate total	-20.35 -38.56 -26.77 -36.75 24.63 -40.14 -34.18 24.72 -22.56	67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01	J/UJ
CC-full scan 4/23/10	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	-21.09 -39.97 -33.99 -25.02	67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	J/UJ
CC-SIM 4/28/10	fluorene benzo(b)fluoranthene	-21.84 -40.40	PAH SIM: 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00RE, 67SB01-01, 67SB01-01DRE, 67SB01-03	J/UJ
CC-SIM 4/28/10	2-methylnaphthalene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene	-20.18 -35.93 25.96	PAH SIM: 67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05	J/UJ

Blanks

VOA

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

Blank ID	Compound	Concentration	Reporting Limit
VBLKIJ	methylene chloride	1J ug/Kg	5 ug/Kg
	toluene	0.7J	5
67ER01	acetone	3.5 ug/L	2.5 ug/L
	methylene chloride	1.5	0.5
67ER02	acetone	3.2	2.5
	methylene chloride	1.3	0.5
67ER03	acetone	2.7	2.5
	methylene chloride	1.1	0.5
	2-butanone	2J	2.5
67FB01	acetone	3.7	2.5
	methylene chloride	1.6	0.5
67FB01	acetone	5.1	2.5

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

Sample ID	Compound	Q Flag
67SB05-05, 67SB08-05	acetone	U at RL
67SB07-05	acetone	U
67SB07-00, 67SD01, 67SB07-05, 67SB01-01D	methylene chloride	U at RL
67SB01-01, 67SB01-01D, 67SB05-00, 67SB05-01	2-butanone	U at RL
67SB07-01, 67SB07-05, 67SB01-01D	toluene	U at RL

SVOA

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

Blank ID	Compound	Concentration	Reporting Limit
SBLKPN	bis(2-ethylhexyl)phthalate	58J ug/Kg	170 ug/Kg
SBLKPN-SIM	naphthalene	1.0J ug/Kg	8.3 ug/Kg
	2-methylnaphthalene	1.0J	8.3
	acenaphthylene	0.86J	8.3
	acenaphthene	0.85J	8.3
	fluorene	0.94J	8.3
	phenanthrene	2.2J	8.3
	anthracene	1.2J	8.3
	fluoranthene	1.7J	8.3
	pyrene	1.6J	8.3
	benzo(a)anthracene	1.3J	8.3
	chrysene	0.97J	8.3
	benzo(b)fluoranthene	0.59J	8.3
	benzo(k)fluoranthene	1.1J	8.3
	benzo(a)pyrene	0.91J	8.3
	indeno(1,2,3-cd)pyrene	1J	8.3
	benzo(g,h,i)perylene	0.78J	8.3
67ER01	naphthalene	0.097J ug/L	0.21 ug/L
67ER02	naphthalene	0.093J	0.21
67ER03	naphthalene	0.079J	0.22
67FB01	naphthalene	0.098J	0.21
	2-methylnaphthalene	0.021J	0.21

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

Sample ID	Compound	Q Flag
67SB07-01, 67SD02, 67SD03, 67SD05	bis(2-ethylhexyl)phthalate	U at RL
67SD01, 67SD01D	bis(2-ethylhexyl)phthalate	U
PAH SIM: 67SD01D, 67SD03	naphthalene	U at RL
PAH SIM: 67SD01D, 67SD03, 67SD04, 67SD05	2-methylnaphthalene	U at RL
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	acenaphthylene	U at RL
PAH SIM: 67SD01D, 67SD05	fluorene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD01D, 67SD02, 67SD05	phenanthrene	U at RL

Sample ID	Compound	Q Flag
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	anthracene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	fluoranthene	U at RL
PAH SIM: 67SB07-00, 67SB07-01, 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	pyrene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	benzo(a)anthracene	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	chrysene	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(b)fluoranthene	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(k)fluoranthene	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD02, 67SD03	benzo(a)pyrene	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD01	indeno(1,2,3-cd)pyrene	U at RL
PAH SIM: 67SB08-00D, 67SB08-01	benzo(g,h,i)perylene	U at RL

GRO

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

Blank ID	Compound	Concentration	RL	Action Level
VBLKCX	GRO	0.041J mg/Kg	0.5 mg/Kg	RL
VBLKDA	GRO	0.04J	0.5	RL

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

Sample ID	Compound	Q Flag
all samples except 67SB08-01	GRO	U at RL

DRO

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

Blank ID	Compound	Concentration	Action Level	Q Flag
PBLKPY	DRO	3.5J mg/Kg	RL	U at RL
PIBLKXF	DRO	0.022J mg/L	RL	U at RL
PIBLKXG	DRO	0.19J mg/L	RL	U at RL
PIBLKXQ	DRO	0.14J mg/L	RL	U at RL
PIBLKXR	DRO	0.30J mg/L	RL	U at RL

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

Sample ID	Compound	Q Flag
67SB01-00, 67SB01-01, 67SD01-01D, 67SB-01-03, 67SB05-05, 67SB07-00	DRO	U at RL

Metals by 6020 & 7471

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	lead	0.016B mg/Kg	RL	U at RL
ICB 4/17	antimony	0.252B ug/L	RL	U at RL
	silver	0.052B ug/L	RL	U at RL
CCB, 4/17 17:09	arsenic	0.090B ug/L	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL up to RL except 67SD01	antimony	U at RL
	silver	U at RL
67SB08-05	lead	U at RL
67SB07-05, 67SB01-03	arsenic	U at RL

Tin by 6010B

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	0.559B mg/Kg	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Internal Standard Area Recoveries

SVOA

Sample 67SB01-00 exhibited non-compliant area recoveries for 5 of 6 internal standards; therefore the sample was re-analyzed. The re-analysis exhibited less non-compliance with low recovery for standard perylene-d12; therefore re-analyzed sample was used and all compound results associated with this standard were qualified as estimated (J/UJ).

Sample 67SB01-01D exhibited non-compliant area recoveries for 4 of 6 internal standards; therefore the sample was re-analyzed. The re-analysis exhibited less non-compliance with low recovery for standard perylene-d12; therefore re-analyzed sample was used and all compound results associated with this standard were qualified as estimated (J/UJ).

Surrogate Recoveries

VOA

The following samples exhibited non-compliant surrogate recoveries and were qualified as stated in the table below. All samples with low recoveries were re-analyzed with non-compliant recoveries were exhibited; therefore the initial analysis for all samples was used.

Sample ID	Non-Compliant Surrogate	% Rec	QC limit	Qualifier
67SD02	bromofluorobenzene	124	85-120	J
67SD03	toluene-d8	83	85-115	J/UJ
67SB08-01	bromofluorobenzene	84	85-120	J/UJ
67SB08-05	1,2-dichloroethane-d4	140	70-139	J
67SB07-00	toluene-d8 bromofluorobenzene	83 76	85-115 85-120	J/UJ

Laboratory Control Sample

SVOA

All submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R) in all samples.

Matrix Spike

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SD01	p-phenylenediamine 1-naphthylamine 3,3'-dimethylbenzidine	0 6 5	0 4 3	20-150 20-150 20-150	J/R
	2-naphthylamine	16	15	20-150	J/UJ
67SD01 (SIM)	anthracene indeno(1,2,3-cd)pyrene	112 189	108 150	55-105 50-110	J

DRO

The matrix spike pair analysis submitted in this SDG exhibited non-compliant %Rs for DRO, requiring qualification in the sediment field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Compound	Samples	%R	Q Flag
67SD01	DRO	all sediment samples	42/36	J/UJ

Metals by 6020 & 7471

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for three analytes. A summary of these non-compliances and affected samples and actions are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SD01	antimony	all samples	9/12	J/UJ

Serial Dilutions

Metals by 6020 & 7471

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

SD	Analytes	Samples	%D	Q Flag
67SD01	cobalt copper lead vanadium	all samples	16 13 20 14	J/UJ

Field Duplicates

VOA

Sample 67SD01 and field duplicate 67SD01D exhibited non-compliant results for carbon disulfide at 150% RPD; therefore results were qualified as estimated (J/UJ).

SVOA

Sample 67SD01 (SIM) and field duplicate 67SD01D (SIM) exhibited non-compliant results for fluoranthene, pyrene, benzo (a) anthracene, and chrysene at 200% RPD; therefore results were qualified as estimated (J/UJ).

Metals by 6020 & 7471

The field duplicate pairs exhibited non-compliant field duplicate reproducibility for the following analytes. These field duplicate pairs and analytes were flagged as noted in the table below based on Region II guidelines.

Sample ID	Analyte	RPD or Absolute Difference	Q Flag
67SB01-01/67SB01-01D	lead	180	R
67SB08-00/67SB08-00D	barium nickel lead	67 57 70	J

Identification/Quantitation

VOA

Samples 67SD02RE, 67SD03RE, 67SD08-01RE, 67SB08-05RE and 67SB07-00RE were not used, in favor of the initial analysis, due to non-compliant surrogate recoveries.

SVOA

Samples 67SB01-00 and 67SB01-01D were not used, in favor of the re-analysis, due to non-compliant internal standard area recoveries.

Metals by 6020 & 7471

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

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice-President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB05-05, 67SB08-05	acetone	+	U at RL
67SB07-05	acetone	+	U
67SB07-00, 67SD01, 67SB07-05, 67SB01-01D	methylene chloride	+	U at RL
67SB01-01, 67SB01-01D, 67SB05-00, 67SB05-01	2-butanone	+	U at RL
67SB07-01, 67SB07-05, 67SB01-01D	toluene	+	U at RL
67SD02, 67SB08-05	all results	+	J
67SD03, 67SB08-01, 67SB07-00	all results	+/-	J/UJ
67SD01, 67SD01D	carbon disulfide	+/-	J/UJ
67SD02RE, 67SD03RE, 67SD08-01RE, 67SB08-05RE and 67SB07-00RE	all results	+/-	R

SVOA

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
67SD01, 67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	2-picoline nitrosomethylethylamine n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	+/-	J/UJ

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
67SD01	benzyl alcohol nitrobenzene bis(2-chloroethoxy)methane hexachloropropene n-nitroso-di-n-butylamine 1,4-napthaquinone 4-nitrophenol pentachloronitrobenzene dinoseb	+/-	J/UJ
67SD02, 67SD03, 67SD04, 67SD05, 67SD01D	nitrobenzene hexachloropropene n-nitroso-di-n-butylamine 7,12-dimethylbenz(a)anthracene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-	J/UJ
67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05, 67SB05-00, 67SB05-01	pyridine methyl methanesulfonate aniline 2-chlorophenol benzyl alcohol n-nitroso-di-n-propylamine methapyrilene benzo(b)fluoranthene diallate total	+/-	J/UJ
67SB05-05, 67SB01-00, 67SB01-01, 67SB01-01D, 67SB01-03	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	+/-	J/UJ
PAH SIM: 67SB05-00, 67SB05-01, 67SB05-05, 67SB01-00RE, 67SB01-01, 67SB01-01DRE, 67SB01-03	fluorene benzo(b)fluoranthene	+/-	J/UJ
PAH SIM: 67SB08-00, 67SB08-00D, 67SB08-01, 67SB08-05, 67SB07-00, 67SB07-01, 67SB07-05	2-methylnaphthalene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene	+/-	J/UJ
67SB07-01, 67SD02, 67SD03, 67SD05	bis(2-ethylhexyl)phthalate	+	U at RL
67SD01, 67SD01D	bis(2-ethylhexyl)phthalate	+	U
PAH SIM: 67SD01D, 67SD03	naphthalene	+	U at RL
PAH SIM: 67SD01D, 67SD03, 67SD04, 67SD05	2-methylnaphthalene	+	U at RL
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	acenaphthylene	+	U at RL
PAH SIM: 67SD01D, 67SD05	fluorene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD01D, 67SD02, 67SD05	phenanthrene	+	U at RL

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
PAH SIM: 67SD01, 67SD01D, 67SD02, 67SD03, 67SD04, 67SD05	anthracene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	fluoranthene	+	U at RL
PAH SIM: 67SB07-00, 67SB07-01, 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	pyrene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	benzo(a)anthracene	+	U at RL
PAH SIM: 67SB08-01, 67SD01, 67SD02, 67SD03, 67SD04	chrysene	+	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(b)fluoranthene	+	U at RL
PAH SIM: 67SB08-01, 67SD02, 67SD03	benzo(k)fluoranthene	+	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD02, 67SD03	benzo(a)pyrene	+	U at RL
PAH SIM: 67SB07-00, 67SB08-01, 67SD01	indeno(1,2,3-cd)pyrene	+	U at RL
PAH SIM: 67SB08-00D, 67SB08-01	benzo(g,h,i)perylene	+	U at RL
PAH SIM: 67SB01-00RE, 67SB01-01DRE	all compounds associated with: perylene-d12	+/-	J/UJ
all samples	p-phenylenediamine	+/-	J/R
67SD01	p-phenylenediamine 1-naphthylamine 3,3'-dimethylbenzidine	+/-	J/R
67SD01	2-naphthylamine	+/-	J/UJ
67SD01 (SIM)	anthracene indeno(1,2,3-cd)pyrene	+	J
PAH SIM: 67SD01, 67SD01D	fluoranthene, pyrene, benzo(a)anthracene, chrysene	+/-	J/UJ
PAH SIM: 67SB01-00, 67SB01-01D	all results	+/-	R

GRO

Sample ID	Compound	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples except 67SB08-01	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
67SD05	DRO	+/-	J/UJ
67SB01-00, 67SB01-01, 67SD01-01D, 67SB-01-03, 67SB05-05, 67SB07-00	DRO	+J	U at RL
all sediment samples	DRO	+/-	J/UJ

Summary of Data Qualifications

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL except 67SD01	antimony	+J	U at RL
	silver	+J	U at RL
67SB08-05	lead	+J	U at RL
67SB07-05, 67SB01-03	arsenic	+J	U at RL
all samples	antimony	+/-	J/UJ
all samples	cobalt copper led vanadium	+/-	J/UJ
67SB01-01/67SB01-01D	lead	+	R
67SB08-00/67SB08-00D	barium nickel lead	+	J
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

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

July 11, 2010

SDG# 1003197, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003197. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7470A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Tin	Metals
67ER01	1003197-02	water	X	X	X	X	X	X
67ER02	1003197-03	water	X	X	X	X	X	X
67ER03	1003197-06	water	X	X	X	X	X	X
67ER04	1003197-07	water	X	X	X	X	X	X
67ER05	1003197-12	water	X	X	X	X	X	X
67ER06	1003197-18	water	X	X	X	X	X	X
67ER07	1003197-21	water	X	X	X	X	X	X
67ER08	1003197-23	water	X	X	X	X	X	X
67FB01	1003197-04	water	X	X	X	X	X	X
67FB02	1003197-08	water	X	X	X	X	X	X
67GW01	1003197-17	water	X	X	X	X	X	X
67GW02	1003197-19	water	X	X	X	X	X	X
67GW03	1003197-24	water	X	X	X	X	X	X
67GW04	1003197-20	water	X	X	X	X	X	X
67GW05	1003197-15	water	X	X	X	X	X	X
67GW06	1003197-16	water	X	X	X	X	X	X
67GW07	1003197-14	water	X	X	X	X	X	X
67GW08	1003197-10	water	X	X	X	X	X	X
67GW08D	1003197-11	water	X	X	X	X	X	X
67SW03	1003197-01	water	X	X	X	X	X	X
67TB01	1003197-05	water	X		X			
67TB02	1003197-09	water	X		X			
67TB03	1003197-13	water	X		X			
67TB04	1003197-22	water	X		X			

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Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Tin	Metals
67TB05	1003197-25	water	X		X			
67GW08 MS	1003197-10MS	water	X	X	X	X	X	X
67GW08 MSD	1003197-10MSD	water	X	X	X	X	X	X

The following quality control samples were provided with this SDG: sample 67GW08D - field duplicate of sample 67GW08; samples 67ER01, 67ER02, 67ER03, 67ER04, 67ER05, 67ER06, 67ER07 and 67ER08-equipment blanks; samples 67FB01 and 67FB02-field blanks; and samples 67TB01, 67TB02, 67TB03, 67TB04 and 67TB05-trip blanks.

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

information regarding all quality control issues is provided in the body of the report and on the qualification summary page.

VOA

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

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

Due to low recoveries for LCS samples, the associated sample non-detect results were qualified as estimated for one or more compounds.

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

SVOA

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

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

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

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying several compound results as rejected in the associated sample. Several compounds were also qualified as estimated due to low recoveries.

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

No qualifications to the data were required.

Metals by 6020 & 7471

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

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

Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were required for the SVOA fraction as one of the recoveries was not reported on the Form III for one of the LCS samples. The laboratory was contacted and the corrected forms were supplied and used for this report.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-30/10 and samples were received at the laboratory 3/24-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	0.008 0.030 0.037 0.043 0.012 0.003 0.001	67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D, 67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	J/R

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC 4/01/10	dichlorodifluoromethane bromomethane chloroethane iodomethane 3-chloropropene acetonitrile dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	-44.64 -30.76 -27.14 55.79 28.16 30.77 -24.59 -20.44 -22.29 -33.45	67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D	J/UJ
CC 4/01/10	dichlorodifluoromethane bromomethane iodomethane 3-chloropropene acetonitrile methacrylonitrile pentachloroethane dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	-40.60 -24.66 60.21 44.97 42.25 24.48 -20.25 -22.24 -31.68 -22.45 -34.32	67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	J/UJ
IC 4/6/10	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	0.0223 0.0298 0.0364 0.0456 0.0126 0.003 0.001	67ER08, 67GW03	J/R

SVOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 3/17/10	2-picoline	22.651	all samples	J/UJ
	nitrosomethylethylamine	22.006		
	n-nitrosodiethylamine	21.768		
	n-nitrosopyrrolidine	24.941		
	n-nitrosomorpholine	22.939		
	o-toluidine	22.524		
	n-nitrosopiperidine	24.199		
	p-phenylenediamine	28.824		
	1-naphthylamine	27.268		
	2-naphthylamine	30.303		
	5-nitro-o-toluidine	27.604		
	n-nitrosodiphenylamine	16.397		
	diallate (trans isomer)	23.234		
	4-aminobiphenyl	24.870		
	4-nitroquinoline-1-oxide	19.692		
	methapyrilene	29.063		
	p-dimethylaminoazobenzene	25.398		
	3,3'-dimethylbenzidine	29.792		
	2-acetylaminofluorene	24.074		
	indeno(1,2,3-cd)pyrene	19.789		
	diallate (total)	19.303		
CC 4/05/10	hexachloropropene	23.29	67SW03, 67ER01, 67ER02, 67FB01	J/UJ
	n-nitroso-di-n-butylamine	-42.46		
	dibenzo(a,h)anthracene	27.64		
	benzo(g,h,i)perylene	30.61		
CC 4/06/10	n-nitroso-di-n-butylamine	-39.22	67ER03, 67ER04, 67FB02, 67GW08	J/UJ
	2-chloronaphthalene	-37.60		
	dibenzo(a,h)anthracene	24.08		
	benzo(g,h,i)perylene	28.35		
CC 4/07/10	nitrobenzene	27.87	67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW08D	J/UJ
	pentachlorophenol	21.36		
	4,6-dinitro-2-methylphenol	20.82		
	pentachloronitrobenzene	22.38		
	dibenzo(a,h)anthracene	32.11		
	benzo(g,h,i)perylene	41.97		
CC 4/07/10	nitrobenzene	31.32	67GW05, 67GW06	J/UJ
	hexachloropropene	25.11		
	n-nitroso-di-n-butylamine	-33.11		
	dibenzo(a,h)anthracene	24.81		
	benzo(g,h,i)perylene	23.08		

Blanks

VOA

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

Blank ID	Compound	Concentration	Reporting Limit
VBLKIR	methylene chloride	0.029J ug/L	0.5 ug/L
VBLKSG	toluene	0.079J	0.5
VBLKSH	acetone	0.97J	2.5
	toluene	0.045J	0.5
67ER06	acetone	3.1 ug/L	2.5 ug/L
	2-butanone	2.1J	2.5
	chloroform	1.2	0.5
	toluene	0.22J	0.5
67ER07	acetone	4.9	2.5
	2-butanone	2.4J	2.5
	chloroform	0.46J	0.5
	toluene	0.14J	0.5
67FB01	acetone	3.7	2.5
	chloroform	1.4	0.5
	toluene	0.97	0.5
67FB01	acetone	5.1	2.5
	toluene	0.054J	0.5

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

Sample ID	Compound	Q Flag
67GW03	methylene chloride	U at RL
67GW03	acetone	U at RL
67GW07	acetone	U
67GW01, 67GW04	2-butanone	U at RL
67GW01, 67GW02, 67GW04, 67GW05, 67GW08, 67GW08D	chloroform	U at RL
67GW03, 67SW03, 67GW08, 67GW08D, 67GW07, 67GW05, 67GW06, 67GW01. 67GW02, 67GW04	toluene	U at RL

SVOA

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

Blank ID	Compound	Concentration	Reporting Limit
SBLKPQ-SIM	pyrene	0.023J ug/L	0.20 ug/L
67ER06	naphthalene	0.074J ug/L	0.21 ug/L
	2-methylnaphthalene	0.016J	0.21
67ER07	naphthalene	0.040J	0.21
67FB01	naphthalene	0.098J	0.21
	2-methylnaphthalene	0.021J	0.21

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

Sample ID	Compound	Q Flag
PAH SIM: 67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08, 67GW08D	naphthalene	U at RL
PAH SIM: 67GW05, 67GW06, 67GW08D	2-methylnaphthalene	U at RL
PAH SIM: 67SW03	pyrene	U at RL

GRO

The associated method and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Compound	Concentration	RL
VBLKCT	GRO	0.03J mg/L	0.5 mg/L
VBLKDF	GRO	0.035J	0.5
VBLKDI	GRO	0.035J	0.5

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

Sample ID	Compound	Q Flag
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW07, 67GW08, 67GW08D, 67SW03	GRO	U at RL

Laboratory Control Sample

VOA

All submitted LCS exhibited low percent recovery for 1,1,1,2-tetrachloroethane at 78% and 78% (QC limit 80-120%); therefore all results for this compound were qualified as estimated (J/UJ) in the following sample: 67ER05, 67TB03, 67GW07, 67GW05, 67GW06, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67TB04 and 67TB05.

SVOA

All submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R) in all samples.

All submitted LCS exhibited low recoveries for diallate (trans isomer); therefore all results for this compound were qualified as estimated (J/UJ).

The submitted LC and LCSD samples exhibited low recoveries for diallate (cis isomer) at 18% and18%; therefore all results for this compound were qualified as estimated (J/UJ) in the associated samples, 67SW03, 67ER01, 67ER02 and 67FB01.

The LCS samples associated with samples 67GW08, 67GW08D, 67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW05 and 67GW06 exhibited zero percent recovery for methapyrilene; therefore the non-detected results in these samples were qualified as rejected (R).

Matrix Spike

VOA

All matrix spike and matrix spike duplicate associated with sample 67GW08 and duplicate sample 67GW08D exhibited low recoveries for styrene at 8% and 3% (QC limit 65-135%); therefore all non-detected results for this compound was qualified as rejected (R) in the associated sample.

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67GW08, 67GW08D	aniline	0	0	20-150	J/R
	o-toluidine	0	0	20-150	
	2,4-dimethylphenol	0	0	19-109	
	4-chloroaniline	0	0	25-115	
	p-phenylenediamine	0	0	20-150	
	1-naphthylamine	0	0	20-150	
	2-naphthylamine	0	0	20-150	
	n-nitrosodiphenylamine	0	0	52-117	
	4-aminobiphenyl	0	0	20-150	
	pronamide	0	0	20-150	
	p-dimethylaminoazobenzene	0	0	20-150	
	3,3'-dimethylbenzidine	0	0	20-150	
	3,3'-dichlorobenzidine	0	0	20-100	
	7,12-dimethylbenz(a)anthracene	4	4	20-150	
	3-methylcholanthrene	0	0	20-150	
	2-picoline	59	4	20-150	
	methapyrilene	17	0	20-150	
	diallate (trans isomer)	18	18	20-150	J/UJ
	diallate (cis isomer)	18	18	20-150	
	anthracene	44	46	55-127	
	benzo(a)pyrene	34	39	46-135	
67GW08 (SIM), 67GW08D (SIM)	anthracene	0	0	55-110	J/R
	benzo(a)pyrene	0	0	55-110	
	acenaphthylene	13	22	50-105	J/UJ
	benzo(a)anthracene	21	34	45-120	

Identification/Quantitation

Metals

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

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D, 67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	+/-	J/R
67SW03, 67ER01, 67ER02, 67ER03, 67ER04, 67FB01, 67FB02, 67TB01, 67TB02, 67GW08, 67GW08D	dichlorodifluoromethane bromomethane chloroethane iodomethane 3-chloropropene acetonitrile dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	+/-	J/UJ
67ER05, 67ER06, 67ER07, 67TB03, 67TB04, 67TB05, 67GW07, 67GW05, 67GW06, 67GW01, 67GW02, 67GW04	dichlorodifluoromethane bromomethane iodomethane 3-chloropropene acetonitrile methacrylonitrile pentachloroethane dibromochloromethane 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane 1,2-dibromo-3-chloropropane	+/-	J/UJ
67ER08, 67GW03	acrolein acetone acrylonitrile 2-butanone propionitrile isobutyl alcohol 1,4-dioxane	+/-	J/R
67GW03	methylene chloride	+	U at RL
67GW03	acetone	+	U at RL
67GW07	acetone	+	U
67GW01, 67GW04	2-butanone	+	U at RL
67GW01, 67GW02, 67GW04, 67GW05, 67GW08, 67GW08D	chloroform	+	U at RL
67GW03, 67SW03, 67GW08, 67GW08D, 67GW07, 67GW05, 67GW06, 67GW01. 67GW02, 67GW04	toluene	+	U at RL
67ER05, 67TB03, 67GW07, 67GW05, 67GW06, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67TB04, 67TB05	1,1,1,2-tetrachloroethane	+/-	J/UJ
67GW08, 67GW08D	styrene	+/-	J/R

SVOA

Sample ID	Compound	Results	Q flag
all samples	2-picoline nitrosomethylethylamine n-nitrosodiethylamine n-nitrosopyrrolidine n-nitrosomorpholine o-toluidine n-nitrosopiperidine p-phenylenediamine 1-naphthylamine 2-naphthylamine 5-nitro-o-toluidine n-nitrosodiphenylamine diallate (trans isomer) 4-aminobiphenyl 4-nitroquinoline-1-oxide methapyrilene p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorene indeno(1,2,3-cd)pyrene diallate (total)	+/-	J/UJ
67SW03, 67ER01, 67ER02, 67FB01	hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67ER03, 67ER04, 67FB02, 67GW08	n-nitroso-di-n-butylamine 2-chloronaphthalene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW08D	nitrobenzene pentachlorophenol 4,6-dinitro-2-methylphenol pentachloronitrobenzene dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
67GW05, 67GW06	nitrobenzene hexachloropropene n-nitroso-di-n-butylamine dibenzo(a,h)anthracene benzo(g,h,i)perylene	+/-	J/UJ
PAH SIM: 67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08, 67GW08D	naphthalene	+	U at RL
PAH SIM: 67GW05, 67GW06, 67GW08D	2-methylnaphthalene	+	U at RL
PAH SIM: 67SW03	pyrene	+	U at RL
all samples	p-phenylenediamine	+/-	J/R
all samples	diallate (trans isomer)	+/-	J/UJ
67SW03, 67ER01, 67ER02, 67FB01	diallate (cis isomer)	+/-	J/UJ
67GW08, 67GW08D, 67ER05, 67GW07, 67GW01, 67ER06, 67GW02, 67GW04, 67ER07, 67ER08, 67GW03, 67GW05, 67GW06	methapyrilene	+/-	J/R

Sample ID	Compound	Results	Q flag
67GW08, 67GW08D	aniline o-toluidine 2,4-dimethylphenol 4-chloroaniline p-phenylenediamine 1-naphthylamine 2-naphthylamine n-nitrosodiphenylamine 4-aminobiphenyl pronamide p-dimethylaminoazobenzene 3,3'-dimethylbenzidine 3,3'-dichlorobenzidine 7,12-dimethylbenz(a)anthracene 3-methylcholanthrene 2-picoline methapyrilene	+/-	J/R
67GW08, 67GW08D	diallate (trans isomer) diallate (cis isomer) anthracene benzo(a)pyrene	+/-	J/UJ
67GW08 (SIM), 67GW08D (SIM)	anthracene benzo(a)pyrene	+/-	J/R
67GW08 (SIM), 67GW08D (SIM)	acenaphthylene benzo(a)anthracene	+/-	J/UJ

GRO

Sample ID	Compound	Results	Q flag
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW07, 67GW08, 67GW08D, 67SW03	GRO	+	U at RL

DRO

Sample ID	Compound	Results	Q flag
No qualifications			

Metals

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	silver	>MDL up to RL	U at RL
67GW02, 67GW03, 67GW04, 67GW01, 67GW05, 67GW06	antimony	>MDL up to RL	U at RL
67SW03	zinc	>MDL up to RL	U at RL
67GW07	nickel	>MDL up to RL	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06, 67GW08	lead	>MDL up to RL	U at RL
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
67SD05	all results	+/-	J/UJ
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

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

July 11, 2010

SDG# 1003198, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003198. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory. Region II has not developed a validation checklist SOP for the methods used to assess the inorganic methods in this SDG (SW-846 methods 6020, 6010B and 7470A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	Dissolved Metals	Dissolved Tin
67GW01	1003197-17	water	X	X
67GW02	1003197-19	water	X	X
67GW03	1003197-24	water	X	X
67GW04	1003197-20	water	X	X
67GW05	1003197-15	water	X	X
67GW06	1003197-16	water	X	X
67GW07	1003197-14	water	X	X
67GW08	1003197-10	water	X	X
67GW08D	1003197-11	water	X	X
67SW03	1003197-01	water	X	X
67GW08 MS	1003197-10MS	water	X	X
67GW08 MSD	1003197-10MSD	water	X	X

The following quality control samples were provided with this SDG: sample 67GW08D-field duplicate of sample 67GW08.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- ICP-MS Tuning *
- Initial/Continuing Calibrations *
- ICSA/ICSAB Standards *
- CRDL Standards *

- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs *
- Serial Dilutions
- Field Duplicates *
- Identification/Quantitation
- Reporting Limits *

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

Overall Evaluation of Data/Potential Usability Issues

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

Dissolved Metals by 6020 & 7471

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

The serial dilution analysis exhibited on non-compliant %D. The non-complaint analyte was flagged as estimated in the associated samples.

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

Dissolved Tin by 6010B

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/22-30/10 and samples were received at the laboratory 3/24-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

Metals by 6020 & 7471

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
CCB	arsenic	0.097B ug/L	RL	U at RL
67FB02	nickel	0.11B ug/L	RL	U at RL
	lead	0.074B ug/L	RL	U at RL

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

Sample ID	Analyte	Q Flag
67SW03	arsenic	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06	lead	U at RL
67GW007	nickel	U at RL

Serial Dilution

Metals by 6020 & 7471

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

SD	Analytes	Samples	%D	Q Flag
67GW08	vanadium	all samples	12	J/UJ

Identification/Quantitation

Metals

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

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Jacqueline Cleveland

Jacqueline Cleveland
President

Summary of Data Qualifications

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
67SW03	arsenic	>MDL up to RL	U at RL
67GW01, 67GW02, 67GW03, 67GW04, 67GW05, 67GW06	lead	>MDL up to RL	U at RL
67GW007	nickel	>MDL up to RL	U at RL
all samples	vanadium	+/-	J/UJ
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
No qualifications were required			

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.

Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

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DataQual

Environmental Services, LLC

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

July 11, 2010

SDG# 1003212, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003212. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB02-00	1003212-01	soil	X	X	X	X	X	X
67SB02-01	1003212-02	soil	X	X	X	X	X	X
67SB02-02	1003212-03	soil	X	X	X	X	X	X
67SB06-00	1003212-04	soil	X	X	X	X	X	X
67SB06-01	1003212-05	soil	X	X	X	X	X	X
67SB06-01D	1003212-06	soil	X	X	X	X	X	X
67SB06-05	1003212-07	soil	X	X	X	X	X	X
67SB02-00 MS	1003212-01MS	soil	X	X	X	X	X	X
67SB02-00 MSD	1003212-01MSD	soil	X	X	X	X	X	X

The following quality control sample was provided with this SDG: sample 67SB06-01D-field duplicate of sample 67SB06-01.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP-MS Tuning *

- GC Performance *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions
- Field Duplicates
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

VOA

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

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

The matrix spike and matrix spike duplicate exhibited low recoveries that resulted in qualifying results as estimated in the associated sample.

The field duplicate pair did not exhibit comparable results for one sample; therefore results were qualified as estimated.

SVOA

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

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

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

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Four compounds were also qualified as estimated due to low recoveries.

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

The matrix spike and matrix spike duplicate exhibited low recoveries that resulted in qualifying results as estimated in the associated sample.

DRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

Metals by 6020 & 7471

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

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

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

The field duplicate pair of sample 67SB06-01/67SB06-01D exhibited several analytes with non-compliant RPDs. These analytes were flagged based on Region II guidance in the field duplicate pair only.

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

Tin by 6010B

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

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required. Clarification of the metals calculations was requested from the laboratory.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/23-25/10 and samples were received at the laboratory 3/26/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

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

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

SVOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 4/16/10	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	19.314 21.849 20.128 19.278 23.521 16.318 29.966	all samples	J/UJ
CC-full scan 4/23/10	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	-21.09 -39.97 -33.99 -25.02	67SB02-00, 67SB02-01 67SB02-02, 67SB06-00 67SB06-01	J/UJ
CC-full scan 4/24/10	p-phenylenediamine indeno(1,2,3-cd)pyrene	-37.28 20.40	67SB06-01D, 67SB06-05	J/UJ
CC-SIM 4/27/10	benzo(a)anthracene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene	24.78 30.91 45.97 30.82	67SB02-00, 67SB02-01 67SB02-02, 67SB06-00 67SB06-01, 67SB06-05	J/UJ
CC-SIM 4/28/10	fluorene benzo(b)fluoranthene	-21.84 -40.40	67SB06-01D	J/UJ

Blanks

VOA

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

Blank ID	Compound	Concentration	Reporting Limit
67ER02	acetone	3.2	2.5
	methylene chloride	1.3	0.5
	toluene	0.81	0.5
67ER04	acetone	3.9	2.5
	methylene chloride	1.1	0.5
	2-butanone	2.5	2.5
	toluene	0.53	0.5
67FB02	acetone	5.1	2.5
	toluene	0.054J	0.5

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

Sample ID	Compound	Q Flag
67SB06-05	acetone	U
67SB06-01, 67SB06-01D, 67SB06-05	methylene chloride	U at RL
67SB06-00	toluene	U at RL
67SB02-01	2-butanone	U at RL
67SB02-00, 67SB02-02	2-butanone	U

SVOA

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

Blank ID	Compound	Concentration	Reporting Limit
SBLKRG	bis(2-ethylhexyl)phthalate	52J ug/Kg	170 ug/Kg
SBLKRG-SIM	naphthalene	1.3J	8.3

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

Sample ID	Compound	Q Flag
67SB02-00, 67SB06-00, 67SB06-01, 67SB06-05	bis(2-ethylhexyl)phthalate	U at RL
PAH SIM: all samples	naphthalene	U at RL

GRO

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

Blank ID	Compound	Concentration	RL	Action Level
VBLKDD	GRO	0.041J mg/Kg	0.5 mg/Kg	RL

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

Sample ID	Compound	Q Flag
all samples	GRO	U at RL

DRO

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

Blank ID	Compound	Concentration	Action Level
PBLKRF	DRO	3.7J mg/Kg	RL

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

Sample ID	Compound	Q Flag
67SB02-01, 67SB06-00, 67SB06-01, 67SB06-01D, 67SB06-05	DRO	U at RL

Metals

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
ICB	antimony	0.252B ug/L	RL	U at RL
	silver	0.052B ug/L	RL	U at RL
CCB3	arsenic	0.089B ug/L	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples except 67SB02-00 >MDL up to RL	antimony	U at RL
	silver	U at RL
67SB02-01	arsenic	U at RL

Tin by 6010B

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	0.879B mg/Kg	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Laboratory Control Sample

SVOA

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

LCS	Sample IDs	Compounds	%Recovery	QC Limit	Q Flag
SRGLCS full scan	all samples	2,4-dichlorophenol	39	42-119	J/UJ
		p-phenylenediamine	0	20-150	J/R
		methapyrilene	5	20-150	

007

Matrix Spike

VOA

The matrix spike and matrix spike duplicate associated with sample 67SB02-00 exhibited low recoveries for ethylbenzene at 69% and 73% (QC limit at 75-125%), m,p-xylene at 69% and 73% (QC limit 80-125%), o-xylene at 71% and 74% (QC limit 75-125%), styrene at 72% and 74% (QC limit 75-125%); therefore the result for these compounds were qualified as estimated (J/UJ).

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SB02-00	1-naphthylamine	9	14	20-150	J/UJ
	2-naphthylamine	15	14	20-150	
	4-aminobiphenyl	15	13	20-150	
	hexachlorocyclopentadiene	36	7	20-134	
	p-phenylenediamine	0	0	20-150	J/R
	methapyrilene	9	9	20-150	
	3,3'-dimethylbenzidine	2	3	20-150	
67SB02-00 (SIM)	benzo(a)anthracene	121	121	50-110	J
	benzo(b)fluoranthene	142	137	45-115	

GRO

The matrix spike and matrix spike duplicate associated with sample 67SB02-00 exhibited low recoveries for gasoline at 62% and 67% (QC limit 75-125%); therefore the result for this compound was qualified as estimated (J/UJ).

Metals

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for one analyte that required qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB02-00	antimony	all samples	14/16	J/UJ

Serial Dilutions

Metals

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

SD	Analytes	Samples	%D	Q Flag
67SB02-00	chromium	all samples	17	J/UJ
	cobalt		14	
	copper		22	
	nickel		18	
	vanadium		14	
	zinc		25	

Field Duplicates

VOA

Sample 67SB06-01 and field duplicate 67SB06-01D did not exhibit comparable results for carbon disulfide with 200% RPD; therefore results were qualified as estimated (J/UJ).

Metals

The field duplicate pair exhibited non-compliant field duplicate reproducibility for the following analytes. These field duplicate pairs and analytes were flagged as noted in the table below based on Region II guidelines.

Sample ID	Analyte	RPD	Q Flag
67SB06-01/67SB06-01D	barium	35	J+
	chromium	86	
	cobalt	82	
	lead	71	
	nickel	56	
	vanadium	53	
	zinc	66	

Identification/Quantitation

Metals

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

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice- President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB06-05	acetone	+	U
67SB06-01, 67SB06-01D, 67SB06-05	methylene chloride	+	U at RL
67SB06-00	toluene	+	U at RL
67SB02-01	2-butanone	+	U at RL
67SB02-00, 67SB02-02	2-butanone	+	U
67SB02-00	ethylbenzene, m,p-xylene, o-xylene, styrene	+/-	J/UJ
67SB06-01, 67SB06-01D	carbon disulfide	+/-	J/UJ

SVOA

Sample ID	Compound	Results	Q flag
all samples	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-/	J/UJ
67SB02-00, 67SB02-01, 67SB02-02, 67SB06-00, 67SB06-01	3-methylphenol p-phenylenediamine methapyrilene benzo(g,h,i)perylene	+/-	J/UJ
67SB06-01D, 67SB06-05	p-phenylenediamine indeno(1,2,3-cd)pyrene	+/-	J/UJ
PAH SIM: 67SB02-00, 67SB02-01, 67SB02-02, 67SB06-00, 67SB06-01, 67SB06-05	benzo(a)anthracene benzo(b)fluoranthene indeno(1,2,3-cd)pyrene dibenzo(a,h)anthracene	+/-	J/UJ
PAH SIM: 67SB06-01D	fluorene benzo(b)fluoranthene	+/-	J/UJ
67SB02-00, 67SB06-00, 67SB06-01, 67SB06-05	bis(2-ethylhexyl)phthalate	+	U at RL
PAH SIM: all samples	naphthalene	+	U at RL
all samples	2,4-dichlorophenol	+/-	J/UJ
all samples	p-phenylenediamine methapyrilene	+/-	J/R

Summary of Data Qualifications

SVOA

Sample ID	Compound	Results	Q flag
67SB02-00	1-naphthylamine 2-naphthylamine 4-aminobiphenyl hexachlorocyclopentadiene	+/-	J/UJ
67SB02-00	p-phenylenediamine methapyrilene 3,3'-dimethylbenzidine	+/-	J/R
PAH SIM: 67SB02-00	benzo(a)anthracene benzo(b)fluoranthene	+	J

GRO

Sample ID	Compound	Results	Q flag
all samples	GRO	+	U at RL
67SB02-00	GRO	+/-	J/UJ

DRO

Sample ID	Compound	Results	Q flag
67SB02-01, 67SB06-00, 67SB06-01, 67SB06-01D, 67SB06-05	DRO	+JB	U at RL

Metals

Sample ID	Analyte	Results	Q flag
all samples except 67SB02-00	antimony	>MDL up to RL	U at RL
	silver	>MDL up to RL	U at RL
67SB02-01	arsenic	>MDL up to RL	U at RL
all samples	antimony	+/-	J/UJ
all samples	chromium cobalt copper nickel vanadium zinc	+/-	J/UJ
67SB06-01, 67SB06-01D	barium chromium cobalt lead nickel vanadium zinc	+	J
all samples	all analytes	+B	J

Summary of Data Qualifications

Tin by 6020

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.
Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

DataQual

Environmental Services, LLC

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

July 11, 2010

SDG# 1003231, CompuChem
NAPR SWMU 67; Ceiba, Puerto Rico

Dear Mr. Kimes,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # 1003231. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II Standard Operating Procedures for the Validation of Organic Data Acquired Using SW-846 Methods (8260B-Rev 2, January 2006- SOP #HW-24, 8270D-Rev 3, October 2006-SOP #HW-22) and professional judgment. Region II has not developed a validation checklist SOP for the methods used to assess the organic methods for hydrocarbons and inorganic methods in this SDG (SW-846 methods 8015_DRO, 8015_GRO, 6020, 6010B and 7471A). Therefore, alternative worksheets were provided. Region II flagging conventions were used. All areas of concern are discussed in the body of the report and a summary of data qualification is provided.

Sample ID	Lab ID	Matrix	VOA App IX	SVOA App IX w/ LL PAH	GRO	DRO	Metals	Tin
67SB03-00	1003231-04	soil	X	X	X	X	X	X
67SB03-01	1003231-05	soil	X	X	X	X	X	X
67SB03-04	1003231-06	soil	X	X	X	X	X	X
67SB04-00	1003231-02	soil	X	X	X	X	X	X
67SB04-01	1003231-01	soil	X	X	X	X	X	X
67SB04-03	1003231-03	soil	X	X	X	X	X	X
67SS01	1003231-07	soil	X	X	X	X	X	X
67SS02	1003231-08	soil	X	X	X	X	X	X
67SB03-04 MS	1003231-06MS	soil	X	X	X	X	X	X
67SB03-04 MSD	1003231-06MSD	soil	X	X	X	X	X	X

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- GC/MS Tuning *
- ICP-MS Tuning *
- GC Performance *
- Initial/Continuing Calibrations

- ICSA/ICSAB Standards *
- CRDL Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs
- Serial Dilutions
- Field Duplicates NA
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

VOA

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

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

SVOA

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

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

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

The matrix spike and matrix spike duplicate exhibited below 10% recoveries that resulted in qualifying three compound results as rejected in the associated sample. Two compounds were also qualified as estimated due to high recoveries.

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

GRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

DRO

Blank contamination was noted in the method blank associated with samples in this batch. Qualifications were added to the data.

Metals by 6020 & 7471

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

The matrix duplicate analysis exhibited one analyte with a RPD >35%. Qualifications were added to the data.

The serial dilution submitted in this SDG exhibited one non-compliant %D. Qualifications were added to the data.

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

Tin by 6010B

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

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

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required. Clarification of the metals calculations was requested from the laboratory.

Technical Holding Times

According to chain of custody records, sampling was performed on 3/25-30/10 and samples were received at the laboratory 3/27-31/10. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibration

VOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC 3/30/10	acrolein	0.028	all samples	J/R
	acrylonitrile	0.046		
	propionitrile	0.018		
	isobutyl alcohol	0.006		
	1,4-dioxane	0.002		
	methylmethacrylate	0.049		
	1,2-dichloropropane	16.913		J/UJ
CC 4/01/10	acetone	0.048	67SB03-01, 67SB03-04 67SS01, 67SS02	J/R
	chloromethane	24.14		J/UJ

SVOA

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

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
IC full scan 4/16/10	2,6-dichlorophenol	19.314	all samples	J/UJ
	hexachloropropene	21.849		
	1,4-napthoquinone	20.128		
	diallate (trans isomer)	19.278		
	4-nitroquinoline-1-oxide	23.521		
	7,12-dimethylbenz(a)anthracene	16.318		
	benzo(k)fluoranthene	29.966		

Standard ID	Compound(s)	RRF, %RSD, %D	Samples	Q Flag
CC-full scan 4/24/10	p-phenylenediamine indeno(1,2,3-cd)pyrene	-37.28 20.40	67SB04-01, 67SB04-00 67SB04-03, 67SB03-00	J/UJ
CC-full scan 4/25/10	p-phenylenediamine	-38.30	67SB03-01, 67SB03-04 67SS01, 67SS02	J/UJ

Blanks

VOA

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

Blank ID	Compound	Concentration	Reporting Limit
67TB05	toluene	0.037J ug/L	5 ug/L
67ER05	acetone	5.1	2.5
	toluene	0.082J	0.5
67ER08	acetone	4	2.5
	toluene	1.0	0.5
67FB02	acetone	5.1	2.5
	toluene	0.054J	0.5

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

Sample ID	Compound	Q Flag
67SB04-00	toluene	U at RL
67SB04-01	acetone	U

SVOA

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

Blank ID	Compound	Concentration	Reporting Limit
SBLKRP (SIM)	naphthalene	1.6J ug/Kg	8.3 ug/Kg
	2-methylnaphthalene	1.0J	8.3
	fluorene	0.48J	8.3
67ER05	benzo(k)fluoranthene	0.011J ug/L	0.20 ug/L
67ER08	naphthalene	0.11J	0.20
	2-methylnaphthalene	0.020J	0.20

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

Sample ID	Compound	Q Flag
PAH SIM: all samples	naphthalene	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	2-methylnaphthalene	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	fluorene	U at RL
PAH SIM: 67SB03-00, 67SB04-00, 67SB04-01	benzo(k)fluoranthene	U at RL

GRO

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

Blank ID	Compound	Concentration	RL	Action Level
VBLKDG	GRO	0.043J mg/Kg	0.5 mg/Kg	RL
VBLKDI	GRO	0.044J	0.5	RL

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

Sample ID	Compound	Q Flag
all samples	GRO	U at RL

DRO

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

Blank ID	Compound	Concentration	Action Level	Q Flag
PBLKRO	DRO	4.3J mg/Kg	RL	U at RL

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

Sample ID	Compound	Q Flag
all samples	DRO	U at RL

Tin by 6010B

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

Blank ID	Analyte	Concentration	Action Level	Q Flag
PBS	tin	1.544B mg/Kg	RL	U at RL

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

Sample ID	Analyte	Q Flag
all samples >MDL up to RL	tin	U at RL

Laboratory Control Sample

SVOA

The submitted LCS exhibited zero percent recovery for p-phenylenediamine; therefore all non-detected results for this compound were qualified as rejected (R).

Matrix Spike

SVOA

The submitted matrix spike and matrix spike duplicate exhibited non-compliant recoveries requiring qualification or rejection in the associated sample. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD Associated Sample ID	Compounds	MS %Rec	MSD % Rec	QC Limit	Q Flag
67SB04-01	p-phenylenediamine	0	0	20-150	J/R
	1-naphthylamine	10	9	20-150	
	methapyrilene	0	0	20-150	
	3,3'-dimethylbenzidine	7	6	20-150	
67SB04-01 (SIM)	anthracene	107	116	55-105	J
	benzo(a)anthracene	114	122	50-110	

Metals by 6020 & 7471

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for two analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB04-01	antimony	all samples	19/18	J/UJ
	cadmium		128/127	J+

Tin by 6010B

The matrix spike analysis submitted in this SDG exhibited non-compliant %Rs for tin, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MS/MSD	Analytes	Samples	%R	Q Flag
67SB04-01	tin	all samples	72.1/73.4	J/UJ

Matrix Duplicate

Metals by 6020 & 7471

The matrix duplicate analysis submitted in this SDG exhibited one non-compliant RPD, requiring qualification in the field samples. A summary of this non-compliance and affected samples are noted in the following table.

MD	Analytes	Samples	RPD	Q Flag
67SB04-01	chromium	all samples	72	J/UJ

Serial Dilutions

Metals by 6020 & 7471

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

SD	Analytes	Samples	%D	Q Flag
67SB04-01	chromium	all samples	14	J/UJ

Identification/Quantitation

SVOA

According to the case narrative, and raw data, benzo(b)fluoranthene and benzo(k)fluoranthene could not be chromatographically resolved for sample 67SB03-01 (SIM) and 67SB03-04 (SIM). Therefore results for these compounds were flagged JN, indicating the presence of the compounds was tentatively identified and the associated numerical value represents its approximate concentration.

Metals by 6020 & 7471

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

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Jacqueline Cleveland
Vice- President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q flag
all samples	acrolein acrylonitrile propionitrile isobutyl alcohol 1,4-dioxane methylmethacrylate	+/-	J/R
all samples	1,2-dichloropropane	+/-	J/UJ
67SB03-01, 67SB03-04, 67SS01, 67SS02	acetone	+/-	J/R
67SB03-01, 67SB03-04, 67SS01, 67SS02	chloromethane	+/-	J/UJ
67SB04-00	toluene	+	U at RL
67SB04-01	acetone	+	U

SVOA

Sample ID	Compound	Results	Q flag
all samples	2,6-dichlorophenol hexachloropropene 1,4-napthoquinone diallate (trans isomer) 4-nitroquinoline-1-oxide 7,12-dimethylbenz(a)anthracene benzo(k)fluoranthene	+/-	J/UJ
67SB04-01, 67SB04-00, 67SB04-03, 67SB03-00	p-phenylenediamine indeno(1,2,3-cd)pyrene	+/-	J/UJ
67SB03-01, 67SB03-04, 67SS01, 67SS02	p-phenylenediamine	+/-	J/UJ
PAH SIM: all samples	naphthalene	+	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	2-methylnaphthalene	+	U at RL
PAH SIM: 67SB03-04, 67SS01, 67SS02, 67SB04-01, 67SB04-00	fluorene	+	U at RL
PAH SIM: 67SB03-00, 67SB04-00, 67SB04-01	benzo(k)fluoranthene	+	U at RL
all samples	p-phenylenediamine	-	R
67SB04-01	p-phenylenediamine 1-naphthylamine methapyrilene 3,3'-dimethylbenzidine	+/-	J/R
PAH SIM: 67SB04-01	anthracene benzo(a)anthracene	+	J
PAH SIM: 67SB03-01, 67SB03-04	benzo(b)fluoranthene benzo(k)fluoranthene	+/-	JN

GRO

Sample ID	Compound	Results	Q flag
all samples	GRO	+	U at RL

010

Summary of Data Qualifications

DRO

Sample ID	Compound	Results	Q flag
all samples	DRO	+BJ	U at RL

Metals by 6020 & 7471

Sample ID	Analyte	Results	Q flag
all samples	antimony	+/-	J/UJ
all samples	cadmium	+	J
all samples	chromium	+/-	J/UJ
all samples	zinc	+/-	J/UJ
all samples	all analytes	+B	J

Tin by 6020

Sample ID	Analyte	Results	Q flag
all samples >MDL up to RL	tin	+J	U at RL

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
N	analyte has been tentatively identified
JN	analyte has been tentatively identified, estimated value
R	result is rejected; the presence or absence of the analyte cannot be verified

Method/Preparation/Field QC Blank Qualification Flags (Q-Flags)

Organic Methods

NA	The sample result for the blank contaminant is greater than the RL (2X sample RL for common laboratory contaminants) when the blank value is less than the RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
U*	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is qualified as non-detect U at the reported concentration.
RL**	The sample result for the blank contaminant is less than the RL (2X sample RL for common laboratory contaminants) but greater than the MDL when the blank value is less than the RL. The sample result for the blank contaminant is changed to the RL and qualified as non-detect U.

* This guideline is used when the laboratory is reporting non-detects to the MDL. ** This guideline is used when the laboratory is reporting non-detects to the RL.

Inorganic Methods

ICB/CCB/PB Action:

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the ICB/CCB/PB result is less or greater than the RL.

Glossary of Qualification Flags and Abbreviations, continued

R -	Sample result is greater than the RL and less than the ICB/CCB/PB value when the ICB/CCB/PB value is greater than the RL.
J -	Sample result is greater than the ICB/CCB/PB value but less than 10X the ICB/CCB/PB value when ICB/CCB/PB value is greater than the RL.
J/UJ -	Sample result is less than 10X RL when blank result is below the negative RL.

Field QC Blank action:

Note – Use field blanks to qualify data only if field blank results are greater than prep blank results.
Do not use rinsate blank associated with soils to qualify water samples and vice versa.

No Action -	The sample result is greater than the RL and greater than ten times (10X) the blank value.
U -	The sample result is greater than or equal to the MDL but less than or equal to the RL, result is reported as non-detect at the reported concentration, when the FB result is less or greater than the RL.
R -	Sample result is greater than the RL and less than the FB value when the FB value is greater than the RL.
J -	Sample result is greater than the FB value but less than 10X the FB value when FB value is greater than the RL.

General Abbreviations

RL	reporting limit
IDL	instrument detection limit
MDL	method detection limit
CRDL	contract required detection limit
CRQL	contract required quantitation limit
+	positive result
-	non-detect result

PUERTO RICAN CHEMIST CERTIFICATION

Daliz Estades Santaliz

Licensed Chemist

To Whom It May Concern:

I, Daliz M. Estades Santaliz, in my capacity as Puerto Rico Certified Chemist, hereby certify the attached Analytical Results of samples analyzed for Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003194-01
1003194-02
1003194-03
1003194-05
1003194-06

Lcda. Daliz M. Estades Santaliz

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A 1325609

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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 Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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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 SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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Daliz 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 Range organics fraction following Method 8015C, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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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 SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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Daliz 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 Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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Daliz 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 Semivolatile fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003194-01	1003194-11
1003194-02	1003194-12
1003194-03	1003194-13
1003194-04	1003194-14
1003194-05	1003194-15
1003194-06	1003194-16
1003194-07	1003194-17
1003194-08	1003194-18
1003194-09	1003194-19
1003194-10	1003194-20

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Daliz 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 VOC following Method 8260B, from Project Name NAPR NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-05	1003197-18
1003197-06	1003197-19
1003197-07	1003197-20
1003197-08	1003197-21
1003197-09	1003197-22
1003197-10	1003197-23
1003197-11	1003197-24
1003197-12	1003197-25
1003197-13	

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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 Range organics fraction following Method 8015C, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

Lcda. Daliz M. Estades Santaliz

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Daliz 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 Gasoline Range Organics (GRO) following Method 8015B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-05	1003197-18
1003197-06	1003197-19
1003197-07	1003197-20
1003197-08	1003197-21
1003197-09	1003197-22
1003197-10	1003197-23
1003197-11	1003197-24
1003197-12	1003197-25
1003197-13	

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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 Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

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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 SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

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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 Semivolatile fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003197-01	1003197-14
1003197-02	1003197-15
1003197-03	1003197-16
1003197-04	1003197-17
1003197-06	1003197-18
1003197-07	1003197-19
1003197-08	1003197-20
1003197-10	1003197-21
1003197-11	1003197-23
1003197-12	1003197-24

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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 APPIX metals (minus tin) and mercury following Method SW 846-6020, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003198-01	1003198-06
1003198-02	1003198-07
1003198-03	1003198-08
1003198-04	1003198-09
1003198-05	1003198-10

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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 Metal Tin following Method SW 846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003198-01	1003198-06
1003198-02	1003198-07
1003198-03	1003198-08
1003198-04	1003198-09
1003198-05	1003198-10

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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 SWMU67/DO, and Laboratory ID Numbers.

1003212-01
1003212-02
1003212-03
1003212-04
1003212-05
1003212-06
1003212-07

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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 range organics fraction, following Method 8015C from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003212-01
1003212-02
1003212-03
1003212-04
1003212-05
1003212-06
1003212-07

Lcda. Daliz M. Estades Santaliz

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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 SWMU67/DO, and Laboratory ID Numbers.

1003231-01
1003231-02
1003231-03
1003231-04
1003231-05
1003231-06
1003231-07
1003231-08

Lcda. Daliz M. Estades Santaliz

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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 SWMU67/DO, and Laboratory ID Numbers.

1003231-01
1003231-02
1003231-03
1003231-04
1003231-05
1003231-06
1003231-07
1003231-08

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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 Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003249-02

Lcda. Daliz M. Estades Santaliz

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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 Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003249-01

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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 TCLP metals and mercury following Method SW846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003249-01

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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 TCLP metals and mercury following Method SW846, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003250-01

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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 Wet Chemistry fraction following current EPA methods, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers.

1003250-02

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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 Volatile Fraction following Method 8260B, from Project Name NAPR SWMU67/DO, and Laboratory ID Numbers:

1003250-01

Lcda. Daliz M. Estades Santaliz

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Appendix F
Data Quality Evalution

APPENDIX F

Data Quality Evaluation

Data Quality Evaluation-2010 Field Event

DataQual Environmental Services performed data validation on the solid waste management unit (SWMU) 67 data collected in March 2010. This data was used to support the SWMU 67 Phase I Resource Conservation and Recovery Act Field Investigation report.

The data validation was performed in accordance with the SW-846 methods utilized by the laboratory, the Region II standard operating procedures (SOPs) 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.

Samples were validated based on the following criteria as applicable to each method and/or analysis batch and did not include recalculation of result concentrations: data completeness, sample condition, technical holding times, gas chromatograph/mass spectrometer tuning, inductively coupled plasma tuning, gas chromatograph performance, initial/continuing calibrations, interference check sample (ICS)A solution/ICSAB solution standards, contract required detection limit standards, blanks, internal standards, surrogate recoveries, laboratory control samples (LCSs), matrix spike (MS) recoveries, MS duplicate (MSD) relative percent differences, serial dilutions, field duplicates, identification/quantitation, and reporting limits (RLs).

The data review and validation process was independent of the laboratory's checks; it focused on the usability of the data to support the project data interpretation and decision-making process.

Sample results that did not meet the acceptance limit criteria were indicated with a qualifying flag, which is a one or two-letter abbreviation that indicates a possible problem with the data. Flags used may include the following:

- **U** Undetected. Samples were analyzed for this analyte, but it was not detected above the MDL or instrument detection limit (IDL).
- **UJ** Detection limit estimated. Samples were analyzed for this analyte, but the results were qualified as not detected. The result is estimated.
- **J** Estimated. The analyte was present, but the reported value may not be accurate or precise.
- **R** Rejected. The data are unusable. (NOTE: Analyte/compound may or may not be present.)

It is important to note that laboratory qualifying flags are included on the data summary forms (Form I) that are submitted to the project by the laboratory. However, during the data review and validation process, the laboratory qualifying flags are evaluated and may be replaced with validation flags.

Quality Assurance/Quality Control Review-2010 field event

A data quality review was performed on the results of soil and groundwater samples sent to CompuChem Laboratory for analysis of the following analytical suites: Appendix IX volatile organic compounds (VOCs) by SW846 8260B, Appendix IX semivolatile organic compounds (SVOCs) by SW846 8270C with low-level polycyclic aromatic hydrocarbons (PAHs), gasoline range organics (GRO) by SW846 8015B, diesel range organcis (DRO) by SW846 8015B, metals by SW846 6010B/6020B/7470A/7471A, and tin by SW846 6010B. The 2010 samples were assigned to sample delivery groups (SDGs) 1003194, 1003212, 1003231, 10031970, and 1003198 from CompuChem Laboratory. The case narratives and laboratory QC forms were reviewed to determine the usability and validity of the data.

The analytical results are acceptable as reported unless otherwise noted below. The following is a review of quality control (QC) issues that warranted data qualification. The vast majority of data was considered usable as reported or with minor qualification.

Volatile Organic Compounds

- Due to non-conformances in the initial and continuing calibrations, soil sample detect/non-detect results were respectively "J" qualified/"R" qualified for the following compounds: acetone, acrylonitrile, propionitrile, isobutyl alcohol, and 1,4-dioxane and methylmethacrylate. In addition to the analytes noted above, 2-butanone received "J" qualification/"R" qualification for sample detects/non-detects respectively in groundwater samples. Propionitrile did not require qualification in groundwater samples.
- Due to high % difference continuing calibration values associated with the soil samples, sample detects/non-detects for 1,2-dichloropropane required respective "J/UJ" qualification.
- Several samples exhibited non-compliant surrogate recoveries that required "J/UJ" qualification for sample detects/non-detects.
- Sample 67-SB02-00 received "J/UJ" qualification for sample detects/non-detects due to low recoveries in the matrix spike/matrix spike duplicate.
- Carbon disulfide received "J/UJ" qualification in field duplicate pairs 67SB06-01 and 01D due to a lack of field duplicate reproducibility.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil samples. The data was qualified accordingly.
- VOC data, excluding results with "R" qualification, are usable as qualified.

Semivolatile Organic Compounds/Polycyclic Aromatic Hydrocarbons

- Due to non-conformances in the initial and continuing calibrations, sample detect/non-detect results were respectively "J/UJ" qualified for the various compounds.
- Several compounds required "J/R" qualification for sample detects/non-detects due to extremely low recovery in the LCS.
- Sample 67SD01 required "J/UJ" qualification for sample detects/non-detects for several compounds due to non-conformances in the MS/MSD samples.
- Sample 67GW08 required "J/UJ" qualification for sample detects/non-detects for several compounds due to non-conformances in the MS/MSD samples.
- Sample 67SB01-01D exhibited non-compliant results for several internal standards, and as such sample detect/non-detect for associated compounds required "J/UJ" qualification respectively.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil samples. The data was qualified accordingly.
- SVOC data, excluding results with "R" qualification, are usable as qualified.

Gasoline Range Organics

- Sample 67SB02 required "J/UJ" qualification for sample detects/non-detects due to non-conformance in the MS/MSD samples.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil samples. The data was qualified accordingly.
- GRO data are usable as qualified.

Diesel Range Organics

- All DRO samples in SDG 1003194 required "J/UJ" qualification due to non-conformances in the MS/MSD samples.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil samples. The data was qualified accordingly.
- DRO data are usable as qualified.

Metals

- Antimony required "J/UJ" qualification for sample detect/non-detect results due to non-conformances in the MS/MSD samples. Samples associated with SDG 1003231 received "J" qualification for sample detects for cadmium due to non-conformances in the MS/MSD samples.
- The serial dilution results for various SDGs exhibited non-compliant results for various metals. As a result, "J/UJ" qualifications for sample detect/non-detects were required.
- Field duplicate samples 67SB06-01/67SB06-01D and 67SB08-00 /67SB08-00D required "J" qualification for several metals due to a lack of field duplicate reproducibility.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil and groundwater samples. The data was qualified accordingly.
- Metals data are usable as qualified.

Tin

- Tin required "J/UJ" qualification for sample detect/non-detect results in SDG 1003231 due to non-conformances in the MS/MSD samples.
- Blank contamination was exhibited in the method and/or QC/blanks associated with the soil and groundwater samples. The data was qualified accordingly.
- Tin data are usable as qualified.

Concentration Range Evaluation

The data were evaluated to determine whether the laboratory achieved the RLs specified in the work plan Table 3-2. On a whole and in general, the work plan RLs appear to be standard (based on laboratory capabilities) as opposed to established (based on project quantitation limit goals). Contract required quantitation limits (CRQLs) are referenced although CRQLs are not appropriate for SW-846 methods. Meeting screening levels with RLs is not imperative when analyzing for Appendix IX constituents because it is not possible to determine what are constituents of concern when so little is known about the site. Nevertheless, the laboratory utilized low-level methods when possible, such as SW-846 8260B (low-level) and SW-846 6020, but did not use SW-846 8270C_SIM for PAHs. SW-846 6010B was used for analysis of tin.

For this evaluation, nondetect U-Values (includes UJ-qualified results) were compared to Table 3-2 CRQLs. It is important to note that detected results can be U-qualified or UJ-qualified due to blank contamination, and these can appear as U-value v. RL exceedances when detections were greater than the RL. Because these results are treated as nondetects, it is still appropriate to make the comparison.

Although specified in work plan Table 3-2, the laboratory did not provide results for alpha, alpha-Dimethylphenethylamine (122-09-8) and Hexachlorophene (70-30-4).

There were 8,495 results in the data set. Of these, there were 7,096 nondetect (U-qualified or UJ-qualified) results in the data set. Of those, 1,251 nondetect results exceeded the work plan RLs. Refer to Table F-1 which provides a row for each analyte in a solid or aqueous media which exceeded the work plan RL in at least one sample. This occurred for 143 combinations of media, group, and analyte out of a possible 387 combinations.

The remaining 244 combinations of media, group, and analyte are not shown because all nondetect results are less than the work plan RL.

There are a variety of typical and potentially unavoidable reasons why the achieved RLs may be greater than those specified in the work plan:

- The work plan limits may have been specified based on current method detection limits which change periodically.
- If a target compound or analyte is present at an elevated level, the laboratory will dilute the entire sample in order to report that concentration within the instrument's linear calibration range. It may not be possible to analyze the sample at a lesser dilution if the target compound's high concentration is likely to damage or saturate the instrument. The high concentration of a non-target compound or analyte may also necessitate initial dilution for the same reason.
- If matrix effects mask low concentrations, the laboratory may be forced to elevate their limits to demonstrate the fact that low concentrations cannot be detected.
- If matrix effects are particularly strong, the laboratory may be forced to analyze the sample at an initial dilution in an attempt to dilute the matrix effects.
- If historical concentrations warrant, the laboratory detects an odor or the field team designates a sample as "expected high concentration," the laboratory may pre-screen the sample and initially dilute it.
- If the sample appearance indicates possible high concentrations, the laboratory may be forced to analyze the sample at a concentration range different from what is requested. For example, if a sample is designated as "groundwater," but is actually an emulsion or sludge, the laboratory may be forced to analyze the sample using the "medium" instead of the "low" or "SIM" concentration range.
- If the field team cannot provide the full sample volume, the laboratory may be forced to dilute the sample by adding water until the minimum volume is achieved.
- If a soil or sediment sample is characterized by high percent moisture, the RLs will be elevated such that the concentrations and quantitation limits are reported on a dry-weight basis.

Refer to Table F-1. U-Value v. Work Plan RL exceedances fall into two basic categories:

- For some analytes, the U-value exceeds the work plan RL in a few, but not all, samples.
  - The laboratory was capable of and able to achieve the work plan RL, but for a few samples the typical and potentially unavoidable reasons (described above) why RLs may be elevated may have been applicable. For these, the resulting added uncertainty is minor because the laboratory was able to achieve the specified work plan RLs for many of the samples.
- For some analytes, the U-value exceeds the work plan RL in all samples. These instances are highlighted in yellow on Table F-1.
  - The laboratory may have analyzed the samples via a higher concentration range than planned or may have had difficulty with the analysis due to matrix effects or other reasons. The achieved RLs should be evaluated against screening levels to determine that decisions can still be made.

For aqueous metals and filtered metals, nondetect tin was reported at 20 micrograms per liter (µg/L) when the work plan specified 10 µg/L. The adjusted tapwater regional screening level (RSL) is 930 µg/L. There is no maximum contaminant level (MCL) and a marine surface water ecological screening level has not been established. Therefore, the elevated RL is not consequential.

For aqueous total petroleum hydrocarbons (TPH), TPH-DRO had RLs approximately 5X that specified in the work plan and TPH-GRO had RLs approximately 10X that specified in the work plan. RSLs, MCLs, and ecological screening levels have not been established for TPH. Puerto Rico Environmental Quality Board PREQB

underground storage tank (UST) Corrective Action screening levels for petroleum are 50 milligrams per liter (mg/L); therefore, the elevated RL is not consequential.

For aqueous VOCs, ethyl methacrylate and methyl methacrylate had RLs approximately 5X that specified in the work plan. MCLs and ecological screening levels have not been established for these compounds. Adjusted tapwater RSLs are 42 and 140 µg/L for these two compounds, respectively; therefore, the elevated RL is not consequential.

For soil metals, nondetect tin was reported at up to 2X that specified in the work plan. The adjusted residential soil RSL is 4,700 milligrams per kilogram; therefore the elevated RL is not consequential.

For soil SVOCs, pronamide and acid SVOC compounds (comprising 2,3,4,6-Tetrachlorophenol; 2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol; 2,4-Dichlorophenol; 2,4-Dimethylphenol; 2,6-Dichlorophenol; 2-Chlorophenol; 2-Methylphenol; 2-Nitrophenol; 4-Chloro-3-methylphenol; and phenol) had RLs between 350 and 710 µg/kg when the work plan specified RLs of 330 µg/kg. Adjusted residential soil RSLs for these compounds range from 6,100 to 1,800,000 µg/kg; therefore, the elevated RLs are not consequential.

For soil TPH, TPH-GRO had RLs roughly 2-5X that specified in the work plan. RSLs, MCLs, and ecological screening levels have not been established for TPH. PREQB UST Corrective Action screening levels for petroleum are 100 mg/kg; therefore, the elevated RLs are not consequential.

For soil VOCs, ethyl methacrylate had RLs ranging from 35 to 83 µg/kg when the work plan specified 5 µg/kg. Trans-1,4-Dichloro-2-butene had RLs ranging from 14 to 33 µg/kg when the work plan specified 10 µg/kg. MCLs and ecological screening levels have not been established for these chemicals; adjusted residential soil RSLs are 150,000 µg/kg and 6.9 µg/kg, respectively. Therefore, the elevated RLs are not consequential because the RLs are less than the screening level for ethyl methacrylate and the work plan-specified RL for trans-1,4-dichloro-2-butene was already greater than the screening level.

Evaluation of Rejected Data

The majority of the data are usable, with only 4.5% of the total results "R"-qualified as rejected. A total of ten compounds were rejected for all media and only six of the ten (P-phenylenediamine, 1,4-dioxane, acrolein, acrylonitrile, isobutanol, and propionitrile) were rejected in every sample for every matrix. The lack of analytical data for these constituents is not a concern for this release assessment at SWMU 67 based on the following rationale:

- P-phenylenediamine, acrolein, and acrylonitrile are used in processes such as chemical manufacturing and rubber processing which are not associated with SWMU 67 activities.
  - *p*-Phenylenediamine is primarily used as a dye intermediate and as a dye, photographic developing agent and a chemical intermediate, and may be used as an antioxidant in rubber compounds (USEPA, 2000).
  - Acrolein is primarily used to make other chemicals and may also be found in some livestock feed. This constituent may also be added to irrigation canals and the water supplies of some industrial plants to control underwater plant, algae, and slime growth. At much higher concentrations, it is used to make chemical weapons (ATSDR, 2007).
  - Acrylonitrile is used mostly to make plastics, acrylic fibers, and synthetic rubber (ATSDR, 1990).
- There is no toxicity information associated with propionitrile.
- 1,4 Dioxane is generally present where solvents are used. Usable results for other more prevalent solvents such as trichloroethene and tetrachloroethane are available for the release assessment and concentrations of other more prevalent solvents are not indicative of a solvents release. Therefore, the lack of 1,4 dioxane data in site media at SWMU 67 is not a concern.
- Isobutanol may be used as an additive to lube oils and gasoline. Although this constituent may be related to SWMU 67 activities, this constituent has low toxicity and is a minor component of other gasoline/diesel related compounds with higher toxicity and usable data for evaluation in the release assessment phase.

Therefore, the lack of usable results for isobutanol in site media as part of the release assessment at SMWU 67 is not a concern.

Summary of SWMU 67 Data Quality from 2010 Event

Sample 67SD05 contained greater than 50% moisture which required the qualification of all results as estimated "J/UJ". High percent moisture contributes to elevated RLs; however, as described above, the elevation of RLs (to greater than that specified by the work plan Table 3-2) was largely inconsequential.

The data as a whole is of good quality. The majority of the data is usable with only 4.5% of the total results "R" qualified as rejected. The lack of analytical data for these "R" qualified constituents is not a concern for this release assessment at SWMU 67.

Data Quality Evaluation and Quality Assurance/Quality Control Review -2014 Field Events

Because it is a distinct effort, data quality for NAPR SWMU-67 soil cobalt (January, 2014 and July, 2014) were evaluated separately. Samples were assigned to SDGs SH0547 and SH4986 and analyzed at Katahdin Analytical Services, Inc. for cobalt via SW-846 6020A. The laboratory was DoD ELAP accredited for analysis of this analyte in this matrix. Data packages underwent Puerto Rico chemistry review. The data packages were then validated by DataQual Environmental Services, Inc. using EPA Region II Standard Operating Procedure for ICP-MS Data Validation (HW-2b Rev. 15) and professional judgment. No changes were necessary during data validation except for the removal of extraneous laboratory flags. There were no QA/QC issues of significance and hence the entire data set is unqualified. All results were detect, some less than and some greater than the applicable screening levels. A concentration range evaluation is therefore not necessary. The data set is 100% usable as reported.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological Profile for Acrylonitrile

ATSDR. 2007. Toxicological Profile for Acrolein.

USEPA. 2000. Technology Transfer Network, Air Toxic Substances Website; Hazard Summary for p-Phenylenediamine. Created in April 1992- Revised in January 2000.

Table F-1
Concentration Range Evaluation

Media	Group	Analyte	CAS	min U-Value	max U-Value	Work Plan RL	Units	# U-Value > Work Plan RL	Total # Available Results
Aqueous	FMETAL	Tin, Dissolved	7440-31-5_D	20	20	10	UG_L	10	10
Aqueous	METAL	Tin	7440-31-5	20	20	10	UG_L	10	10
Aqueous	SVOA	2,3,4,6-Tetrachlorophenol	58-90-2	10	11	10	UG_L	2	10
Aqueous	SVOA	2,4,5-Trichlorophenol	95-95-4	10	11	10	UG_L	2	10
Aqueous	SVOA	2,4,6-Trichlorophenol	88-06-2	10	11	10	UG_L	2	10
Aqueous	SVOA	2,4-Dichlorophenol	120-83-2	10	11	10	UG_L	2	10
Aqueous	SVOA	2,4-Dimethylphenol	105-67-9	10	11	10	UG_L	2	8
Aqueous	SVOA	2,6-Dichlorophenol	87-65-0	10	11	10	UG_L	2	10
Aqueous	SVOA	2-Chlorophenol	95-57-8	10	11	10	UG_L	2	10
Aqueous	SVOA	2-Methylphenol	95-48-7	10	11	10	UG_L	2	10
Aqueous	SVOA	2-Nitrophenol	88-75-5	10	11	10	UG_L	2	10
Aqueous	SVOA	4-Chloro-3-methylphenol	59-50-7	10	11	10	UG_L	2	10
Aqueous	SVOA	Phenol	108-95-2	10	11	10	UG_L	2	10
Aqueous	SVOA	Pronamide	23950-58-5	10	11	10	UG_L	2	8
Aqueous	TPH	TPH-diesel range	TPH-DRO	0.5	0.56	0.1	MG_L	10	10
Aqueous	TPH	TPH-gas range	TPH-GRO	0.5	0.5	0.05	MG_L	10	10
Aqueous	VOA	Ethyl methacrylate	97-63-2	5	5	1	UG_L	10	10
Aqueous	VOA	Methyl methacrylate	80-62-6	5	5	1	UG_L	10	10
Solid	METAL	Antimony	7440-36-0	1.1	6.2	2	MG_KG	3	35
Solid	METAL	Arsenic	7440-38-2	0.52	3.1	1	MG_KG	3	35
Solid	METAL	Cadmium	7440-43-9	0.59	3.1	0.5	MG_KG	2	35
Solid	METAL	Lead	7439-92-1	0.62	0.62	0.5	MG_KG	1	33
Solid	METAL	Mercury	7439-97-6	0.035	0.043	0.02	MG_KG	9	35
Solid	METAL	Silver	7440-22-4	0.52	3.1	1	MG_KG	3	35
Solid	METAL	Thallium	7440-28-0	0.57	3.1	1	MG_KG	2	35
Solid	METAL	Tin	7440-31-5	5.2	9.9	5	MG_KG	35	35
Solid	SVOA	1,2,4,5-Tetrachlorobenzene	95-94-3	180	360	330	UG_KG	2	35
Solid	SVOA	1,2,4-Trichlorobenzene	120-82-1	180	360	330	UG_KG	2	35
Solid	SVOA	1,2-Dichlorobenzene	95-50-1	180	360	330	UG_KG	2	35
Solid	SVOA	1,3,5-Trinitrobenzene	99-35-4	180	360	330	UG_KG	2	35
Solid	SVOA	1,3-Dichlorobenzene	541-73-1	180	360	330	UG_KG	2	35
Solid	SVOA	1,3-Dinitrobenzene	99-65-0	180	360	330	UG_KG	2	35
Solid	SVOA	1,4-Dichlorobenzene	106-46-7	180	360	330	UG_KG	2	35
Solid	SVOA	1,4-Naphthoquinone	130-15-4	180	360	330	UG_KG	2	35
Solid	SVOA	1-Naphthylamine	134-32-7	180	360	330	UG_KG	2	33
Solid	SVOA	2,2'-Oxybis(1-chloropropane)	108-60-1	180	360	330	UG_KG	2	35
Solid	SVOA	2,3,4,6-Tetrachlorophenol	58-90-2	350	710	330	UG_KG	35	35
Solid	SVOA	2,4,5-Trichlorophenol	95-95-4	350	710	330	UG_KG	35	35
Solid	SVOA	2,4,6-Trichlorophenol	88-06-2	350	710	330	UG_KG	35	35
Solid	SVOA	2,4-Dichlorophenol	120-83-2	350	710	330	UG_KG	35	35
Solid	SVOA	2,4-Dimethylphenol	105-67-9	350	710	330	UG_KG	35	35
Solid	SVOA	2,4-Dinitrotoluene	121-14-2	180	360	330	UG_KG	2	35
Solid	SVOA	2,6-Dichlorophenol	87-65-0	350	710	330	UG_KG	35	35
Solid	SVOA	2,6-Dinitrotoluene	606-20-2	180	360	330	UG_KG	2	35
Solid	SVOA	2-Acetylaminofluorene	53-96-3	180	360	330	UG_KG	2	35
Solid	SVOA	2-Chloronaphthalene	91-58-7	180	360	330	UG_KG	2	35
Solid	SVOA	2-Chlorophenol	95-57-8	350	710	330	UG_KG	35	35
Solid	SVOA	2-Methyl-5-nitroaniline	99-55-8	180	360	330	UG_KG	2	35
Solid	SVOA	2-Methylaniline	95-53-4	180	360	330	UG_KG	2	35
Solid	SVOA	2-Methylphenol	95-48-7	350	710	330	UG_KG	35	35
Solid	SVOA	2-Naphthylamine	91-59-8	180	360	330	UG_KG	2	35
Solid	SVOA	2-Nitrophenol	88-75-5	350	710	330	UG_KG	35	35
Solid	SVOA	2-Picoline	109-06-8	180	360	330	UG_KG	2	35
Solid	SVOA	3-Methylcholanthrene	56-49-5	180	360	330	UG_KG	2	35
Solid	SVOA	3-Methylphenol	108-39-4	260	540	330	UG_KG	7	35
Solid	SVOA	4-Aminobiphenyl	92-67-1	180	360	330	UG_KG	2	35
Solid	SVOA	4-Bromophenyl-phenylether	101-55-3	180	360	330	UG_KG	2	35
Solid	SVOA	4-Chloro-3-methylphenol	59-50-7	350	710	330	UG_KG	35	35
Solid	SVOA	4-Chloroaniline	106-47-8	250	710	660	UG_KG	1	35

Table F-1
Concentration Range Evaluation

Media	Group	Analyte	CAS	min U-Value	max U-Value	Work Plan RL	Units	# U-Value > Work Plan RL	Total # Available Results
Solid	SVOA	4-Chlorophenyl-phenylether	7005-72-3	180	360	330	UG_KG	2	35
Solid	SVOA	4-Methylphenol	106-44-5	260	540	330	UG_KG	7	35
Solid	SVOA	7,12-Dimethylbenz(a)anthracene	57-97-6	180	360	330	UG_KG	2	35
Solid	SVOA	Acetophenone	98-86-2	180	360	330	UG_KG	2	35
Solid	SVOA	Aramite	140-57-8	180	360	330	UG_KG	2	35
Solid	SVOA	Benzyl alcohol	100-51-6	180	360	330	UG_KG	2	35
Solid	SVOA	bis(2-Chloroethoxy)methane	111-91-1	180	360	330	UG_KG	2	35
Solid	SVOA	bis(2-Chloroethyl)ether	111-44-4	180	360	330	UG_KG	2	35
Solid	SVOA	bis(2-Ethylhexyl)phthalate	117-81-7	180	440	330	UG_KG	4	35
Solid	SVOA	Butylbenzylphthalate	85-68-7	180	360	330	UG_KG	2	35
Solid	SVOA	cis-Diallate	17708-57-5	180	360	330	UG_KG	2	35
Solid	SVOA	Diallate	2303-16-4	180	360	330	UG_KG	2	35
Solid	SVOA	Dibenzofuran	132-64-9	180	360	330	UG_KG	2	35
Solid	SVOA	Diethylphthalate	84-66-2	180	360	330	UG_KG	2	35
Solid	SVOA	Dimethyl phthalate	131-11-3	180	360	330	UG_KG	2	35
Solid	SVOA	Di-n-butylphthalate	84-74-2	180	360	330	UG_KG	2	35
Solid	SVOA	Di-n-octylphthalate	117-84-0	180	360	330	UG_KG	2	35
Solid	SVOA	Dinoseb	88-85-7	180	360	330	UG_KG	2	35
Solid	SVOA	Ethyl methanesulfonate	62-50-0	180	360	330	UG_KG	2	35
Solid	SVOA	Hexachlorobenzene	118-74-1	180	360	330	UG_KG	2	35
Solid	SVOA	Hexachlorobutadiene	87-68-3	180	360	330	UG_KG	2	35
Solid	SVOA	Hexachlorocyclopentadiene	77-47-4	180	360	330	UG_KG	2	35
Solid	SVOA	Hexachloroethane	67-72-1	180	360	330	UG_KG	2	35
Solid	SVOA	Hexachloropropene	1888-71-7	180	360	330	UG_KG	2	35
Solid	SVOA	Isophorone	78-59-1	180	360	330	UG_KG	2	35
Solid	SVOA	Isosafrole	120-58-1	180	360	330	UG_KG	2	35
Solid	SVOA	Methyl methanesulfonate	66-27-3	180	360	330	UG_KG	2	35
Solid	SVOA	Nitrobenzene	98-95-3	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosodiethylamine	55-18-5	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosodimethylamine	62-75-9	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitroso-di-n-butylamine	924-16-3	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitroso-di-n-propylamine	621-64-7	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosodiphenylamine	86-30-6	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosomorpholine	59-89-2	180	360	330	UG_KG	2	35
Solid	SVOA	n-Nitroso-n-methylethylamine	10595-95-6	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosopiperidine	100-75-4	180	360	330	UG_KG	2	35
Solid	SVOA	N-nitrosopyrrolidine	930-55-2	180	360	330	UG_KG	2	35
Solid	SVOA	P-dimethylaminoazobenzene	60-11-7	180	360	330	UG_KG	2	35
Solid	SVOA	Pentachlorobenzene	608-93-5	180	360	330	UG_KG	2	35
Solid	SVOA	Pentachloronitrobenzene	82-68-8	180	360	330	UG_KG	2	35
Solid	SVOA	Phenacetin	62-44-2	180	360	330	UG_KG	2	35
Solid	SVOA	Phenol	108-95-2	350	710	330	UG_KG	35	35
Solid	SVOA	Pronamide	23950-58-5	350	710	330	UG_KG	35	35
Solid	SVOA	Pyridine	110-86-1	180	360	330	UG_KG	2	35
Solid	SVOA	Safrole	94-59-7	180	360	330	UG_KG	2	35
Solid	SVOA	trans-Diallate	17708-58-6	180	360	330	UG_KG	2	35
Solid	TPH	TPH-diesel range	TPH-DRO	11	13	3.3	MG_KG	19	35
Solid	TPH	TPH-gas range	TPH-GRO	0.53	1.1	0.25	MG_KG	35	35
Solid	VOA	1,1,1,2-Tetrachloroethane	630-20-6	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,1,1-Trichloroethane	71-55-6	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,1,2,2-Tetrachloroethane	79-34-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,1,2-Trichloroethane	79-00-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,1-Dichloroethane	75-34-3	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,1-Dichloroethene	75-35-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,2,3-Trichloropropane	96-18-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,2-Dibromoethane	106-93-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,2-Dichloroethane	107-06-2	3.5	8.3	5	UG_KG	13	35
Solid	VOA	1,2-Dichloropropane	78-87-5	3.5	8.3	5	UG_KG	13	35

Table F-1
Concentration Range Evaluation

Media	Group	Analyte	CAS	min U-Value	max U-Value	Work Plan RL	Units	# U-Value > Work Plan RL	Total # Available Results
Solid	VOA	2-Chloro-1,3-butadiene	126-99-8	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Allyl chloride	107-05-1	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Benzene	71-43-2	3.5	8.3	5	UG_KG	12	35
Solid	VOA	Bromodichloromethane	75-27-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Bromoform	75-25-2	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Carbon disulfide	75-15-0	3.5	6.4	5	UG_KG	6	35
Solid	VOA	Carbon tetrachloride	56-23-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Chlorobenzene	108-90-7	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Chloroform	67-66-3	3.7	8.3	5	UG_KG	13	35
Solid	VOA	cis-1,3-Dichloropropene	10061-01-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Dibromochloromethane	124-48-1	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Dibromomethane	74-95-3	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Dichlorodifluoromethane (Freon-12)	75-71-8	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Ethyl methacrylate	97-63-2	35	83	5	UG_KG	35	35
Solid	VOA	Ethylbenzene	100-41-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Iodomethane	74-88-4	3.7	6.4	5	UG_KG	6	35
Solid	VOA	m- and p-Xylene	m&pXYLENE	7	17	10	UG_KG	6	35
Solid	VOA	Methylene chloride	75-09-2	3.7	8.3	5	UG_KG	13	35
Solid	VOA	Styrene	100-42-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Tetrachloroethene	127-18-4	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Toluene	108-88-3	3.5	8.3	5	UG_KG	13	35
Solid	VOA	trans-1,2-Dichloroethene	156-60-5	3.5	8.3	5	UG_KG	13	35
Solid	VOA	trans-1,3-Dichloropropene	10061-02-6	3.5	8.3	5	UG_KG	13	35
Solid	VOA	trans-1,4-Dichloro-2-butene	110-57-6	14	33	10	UG_KG	35	35
Solid	VOA	Trichloroethene	79-01-6	3.5	8.3	5	UG_KG	13	35
Solid	VOA	Trichlorofluoromethane (Freon-11)	75-69-4	3.5	8.3	5	UG_KG	13	35