N69321.AR.000058
VIEQUES EAST
5090.3a

Final

Remedial Investigation Report
UXO 1, Eastern Conservation Area (ECA)

Former Vieques Naval Training Range
Vieques, Puerto Rico

Prepared for

Department of the Navy
ATLANTIC

Contract No.
N62470-08-D-1000
CTO-037

July 2012

Prepared by

CH2MHILL®

ES060211161657TPA

Final

Remedial Investigation Report
UXO 1, Eastern Conservation Area (ECA)

Former Vieques Naval Training Range
Vieques, Puerto Rico

Contract Task Order 0037

July 2012

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Atlantic

Under the

LANTDIV CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by

CH2MHILL

Virginia Beach, Virginia

Contents

Section **Page**

Contents ..... **iii**

Acronyms and Abbreviations ..... **ix**

Executive Summary **ES-1**
Introduction ES-1
Remedial Investigation Activities ES-1
Physical Characteristics ES-2
Nature and Extent of Contamination ES-2
MEC ES-2
Environmental Media ES-3
Contaminant Migration ES-4
Land Use ES-4
Human Health Risk Assessment ES-4
Ecological Risk Assessment ES-4
Conclusions and Recommendations ES-4

Resumen Ejecutivo **ES-7**
Introducción ES-7
Actividades de Investigación para la Remediación ES-7
Características Físicas ES-8
Naturaleza y Extensión de la Contaminación ES-9
MEC ES-9
Medios Ambientales ES-9
Migración de Contaminantes ES-10
Uso de los terrenos ES-10
Evaluación de Riesgos a la Salud Humana (HHRA por sus siglas en inglés) ES-10
Evaluación de Riesgos Ecológicos (ERA por sus siglas en inglés) ES-11
Conclusiones y Recomendaciones ES-11

1 Introduction **1-1**
1.1 Objectives and Approach 1-1
1.1.1 Munitions and Explosives of Concern Investigation 1-1
1.1.2 Environmental Investigation 1-2
1.2 Site Background 1-2
1.2.1 Former Vieques Naval Training Range 1-3
1.2.2 UXO 1 1-3
1.2.3 Investigation History 1-3
1.3 Report Organization 1-4

2 Summary of Field Activities **2-1**
2.1 MEC Activities 2-1
2.1.2 Location and Survey Mapping 2-1
2.1.3 Vegetation and Brush Removal 2-2
2.1.4 Surface MEC Removal 2-2
2.1.5 Geophysical Survey 2-3
2.1.6 Data Management 2-6
2.1.7 Quality Control 2-6
2.2 Environmental Investigation Activities 2-7

2.2.1 Sampling Approach and Methods 2-7
2.2.2 Background Sampling 2-10
2.3 Decontamination and Waste Management 2-10
2.4 Environmental Data Management 2-10
2.4.1 Data Tracking and Validation 2-10
2.4.2 Regulatory Standards and Risk-Based Screening Values 2-11
2.5 Biological Assessment 2-11
2.6 Cultural Resource and Archaeological Surveys 2-11
2.7 Deviations from Sampling and Analysis Plan 2-12

3 Physical Characteristics 3-1
3.1 Physical Setting 3-1
3.1.1 Meteorology 3-1
3.1.2 Topography 3-1
3.1.3 Surface Water Hydrology 3-1
3.1.4 Geology 3-1
3.1.5 Hydrogeology 3-2
3.1.6 Land and Water Use 3-2
3.2 Ecological Setting 3-3
3.2.1 Flora 3-3
3.2.2 Fauna 3-4
3.2.3 Rare, Threatened, and Endangered Species 3-4
3.3 Cultural and Archeological Resources 3-4

4 Nature and Extent of Contamination 4-1
4.1 Nature and Extent of Munitions and Explosives of Concern and other Munitions-related Material 4-1
4.2 Nature and Extent of Environmental Media Contamination 4-2
4.2.1 Soil 4-2
4.2.2 Surface Water and Sediment 4-4

5 Chemical Fate and Transport 5-1
5.1 Chemical Mobility and Persistence 5-1
5.1.1 Solubility 5-1
5.1.2 Sorption 5-2
5.1.3 Volatilization 5-2
5.1.4 Transformation 5-2
5.1.5 Degradation 5-3
5.1.6 Bioaccumulation 5-4
5.2 Chemical Migration 5-4
5.2.1 Potential Sources of Contamination 5-4
5.2.2 Migration from Potential Source Areas 5-4
5.2.3 Potential Exposure and Receptor Pathways 5-5

6 MEC Explosive Risk Evaluation 6-1
6.1 Background 6-1
6.2 Explosive Safety Hazards 6-1

7 Human Health Risk Assessment Summary 7-1
7.1 Potential Receptors and Chemicals of Potential Concern 7-1
7.2 Exposure Evaluation 7-2
7.3 Risk Estimates 7-3
7.4 Chemicals of Concern 7-3

8 Ecological Risk Assessment Summary 8-1
8.1 ERA Process and Objectives 8-1
8.2 Ecological Setting 8-1
8.3 Analytical Data Used in the ERA 8-1
8.4 ERA Results 8-2
8.4.1 Terrestrial Habitats 8-2
8.4.2 Aquatic Habitats (ECA Lagoon) 8-2
8.5 ERA Summary and Conclusions 8-3

9 Summary, Conclusions, and Recommendations 9-1
9.1 Summary of Remedial Investigation Activities 9-1
9.1.1 MEC Investigation 9-1
9.1.2 Environmental Investigation 9-1
9.2 Findings 9-2
9.2.1 Physical Characteristics 9-2
9.2.2 Nature and Extent of Contamination 9-2
9.2.3 Contaminant Migration 9-3
9.2.4 Land Use 9-3
9.2.5 Human Health Risk Assessment 9-4
9.2.6 Ecological Risk Assessment 9-4
9.3 Conclusions and Recommendations 9-4

10 References 10-1

List of Tables

1-1 Summary of Previous Investigations and Environmental History

2-1 Summary of "No Finds" During Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011
2-2 Summary of Samples Collected
2-3 MEC/MD Removed from the Sampling Units During Surface Clearance

3-1 Water Column Parameter Measurements – ECA Lagoon
3-2 Physical Sediment Parameter Measurements – ECA Lagoon
3-3 Animals and Plants Observed at the ECA
3-4 Federally Listed Species Occurring or Potentially Occurring at NASD Vieques

4-1 UXO Items Recovered from UXO 1
4-2 MEC/MD Items Encountered in the ECA and Their Constituents
4-3 Incremental Background Sample Results
4-4 Explosives and Total Metals Detection and Exceedances in Surface Soil
4-5 Explosives and Total Metals Detection and Exceedances in Subsurface Soil
4-6 Explosives and Total Metals Detection and Exceedances in Surface Water
4-7 Explosives and Total Metals Detection and Exceedances in Sediment

5-1 Detected Chemicals by Media
5-2 Physical and Chemical Data of Constituents Detected Above Screening Criteria
5-3 Occurrence of Inorganics in Natural Soils

List of Figures

ES-1 Regional Location Map
ES-2 ECA Site Location Map
ES-3 ECA Beach and Lowland Sample Location Map
ES-4 ECA Upland Sample Location Map
ES-5 ECA Lagoon and Lagoon Fringe Sample Location Map
ES-6 MEC, MD and RRD Recovered During TCRA
ES-7 MEC, MD and RRD Recovered During NTCRA
ES-8 Explosives Detections and Exceedances in Surface Soil
ES-9 Conceptual Site Model

1-1 Regional Location Map
1-2 ECA Site Location Map
1-3 Location of Surface MEC Removed

2-1 MEC Removal Areas
2-2 ECA No Finds Locations
2-3 Locations of Detonation Events
2-4 ECA Sample Location Map
2-5 Background Sample Location Map
2-6 ECA Site Photographs
2-7 ECA Beach and Lowland Sample Location Map
2-8 ECA Upland Sample Location Map
2-9 ECA Lagoon and Lagoon Fringe Sample Location Map
2-10 Sample Location Deviations

3-1 ECA Topographic Map
3-2 ECA Generalized Geology Map
3-3 Resolución and Esperanza Aquifers

4-1 MEC, MD and RDD Recovered During TCRA
4-2 MEC, MD and RDD Recovered During NTCRA
4-3 Explosives Detections and Exceedances in Surface Soil
4-4 Total Metals Exceedances in Surface Soil
4-5 Total Metals Exceedances in Subsurface Soil
4-6 Total and Dissolved Metals Exceedances in Surface Water
4-7 Total Metals Exceedances in Sediment

5-1 Conceptual Site Model

List of Appendixes (provided on CD)

A Surface Water and Sediment Sampling Data Sheets
B Incremental Soil and Soil Boring Logs
C General Chemistry Data
D Survey Data
E Data Validation Reports
F Investigation Derived Waste Disposal Information
G Data Quality Evaluation
H SSL Calculation Details
I Biological Assessment

J Analytical Data Summary
K Human Health Risk Assessment
L Ecological Risk Assessment
M Incremental Background Value Technical Memorandum
N Final USEPA and PREQB Response to Comments

Acronyms and Abbreviations

AMS	aerial magnetometer survey
amsl	above mean sea level
ATG	Air-to-Ground
atm-m^3/M	atmospheric cubic meters per mole
BA	biological assessment
BAF	bioaccumulation factor
BERA	baseline ecological risk assessment
bgs	below ground surface
BIP	blow-in-place
CCP	Comprehensive Conservation Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
cm	centimeter
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CPC	Central Processing Center
CSM	Conceptual Site Model
DGM	digital geophysical mapping
DMM	discarded military munitions
DOI	Department of Interior
dw	dry weight
e.g.	exempli gratia (for example)
EADA	elevated anomaly density area
EBS	Environmental Baseline Survey
ECA	Eastern Conservation Area
E_h	oxidation potential
EIS	Environmental Impact Statement
ELCR	excess lifetime cancer risk
EMA	Eastern Maneuver Area
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ERP	Environmental Restoration Program
ESQD	explosive safety quantity distance
ESVs	ecological screening values
F_{oc}	fraction of organic carbon
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	foot or feet
FWS	Fish and Wildlife Service
°F	degrees Fahrenheit
g/g	grams per gram
GIS	geographic information system
GMI	Geo-Marine, Inc.
GPS	Global Positioning System
HA	Hazard Assessment

HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
Hz	hertz
IDW	investigation-derived waste
i.e.	id est (that is)
IM	interim measures
IR	Installation Restoration
IS	incremental sampling
K_d	distribution coefficient
K_h	Henry's Law Constant
K_{oc}	carbon partition coefficient
K_{ow}	octanol-water partition coefficient
LIA	Live Impact Area
LiDAR	light detection and ranging
LOAEL	lowest observed adverse effect level
LUC	Land Use Control
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MATC	maximum acceptable toxicant concentration
MC	munitions constituent
MD	munitions debris
MEC	munitions and explosives of concern
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
mL/g	milliliters per gram
msl	mean sea level
MOV	Municipality of Vieques
MRA	munitions response area
MR	munitions response
MRP	munitions response program
MRS	munitions response site
MSOPP	Master Standard Operating Procedures, Protocols, and Plans
mV	milliVolts
NASD	Naval Ammunition Support Detachment
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NCP	National Contingency Plan
NPL	National Priority List
NTCRA	Non-Time-Critical Removal Action
OB	open burn
OP	Observation Post
PDF	portable document format
pH	potential of hydrogen
ppt	parts per thousand
PRA	Preliminary Range Assessment
PREQB	Puerto Rico Environmental Quality Board

QA	quality assurance
QC	quality control
QCP	quality control plan
RAGS	Risk Assessment Guidance for Superfund
RI	Remedial Investigation
RRD	range-related debris
RSL	regional screening level
RTK	real time kinematic
SAP	Sampling and Analysis Plan
SERA	screening ecological risk assessment
SHPO	state historic preservation office
SI	site inspection
SIA	Surface Impact Area
SOP	standard operating procedure
SSL	soil screening levels
SUXOS	senior UXO supervisor
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time Critical Removal Action
TOC	total organic carbon
TRV	toxicity reference value
RSLs	regional screening levels
UCL	upper confidence limit
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTLs	upper tolerance limits
UXO	unexploded ordnance
UXOQCS	UXO quality control specialist
VNTR	Vieques Naval Training Range
WM	Waste Management

Executive Summary

Introduction

This Remedial Investigation (RI) report presents the results of the RI conducted to characterize the nature and extent of contamination and to assess potential risks to human health and the environment at the Eastern Conservation Area (ECA), designated as UXO 1, located at the former Vieques Naval Training Range (VNTR) in the easternmost portion of Vieques, Puerto Rico (**Figures ES-1 and ES-2**).

UXO 1 is 133 acres in size, was established in 1983 as a conservation area, and is managed as a part of the Vieques National Wildlife Refuge with no planned public access or groundwater use. UXO 1 was not known to have been used as target area for munitions; however, the site is located adjacent to the Live Impact Area (LIA) (UXO Sites 2, 3, and 4), where naval gunfire and air-to-ground (ATG) training activities occurred from the 1970s through 2003. Therefore, munitions and explosives of concern (MEC) and other munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target.

Historical activities at the LIA had the potential to release MEC and other munitions-related material at UXO 1 which, in turn, had the potential to release chemical contaminants to environmental media from historical detonations and from the deterioration of MEC and related munitions debris. Therefore, the objectives of this RI were to:

- Sufficiently characterize the nature and extent of MEC and other munitions-related material
- Assess the explosive safety risk associated with the site (based on the post-interim removal action site conditions and current and future land use)
- Sufficiently characterize the nature and extent of potential contamination within soil, surface water, and sediment, with special emphasis on areas with the highest potential for contamination
- Assess the potential risks posed by potential contamination to human health and the environment.

Remedial Investigation Activities

The UXO 1 RI was implemented through two separate, but related investigations – one focusing on MEC and one focusing on chemical contaminants in the various environmental media primarily associated with historical munitions-related activities. The nature and extent of MEC and other munitions-related material were characterized as part of two interim removal actions: a Time-Critical Removal Action (TCRA) from January through December 2008 to characterize and remove munitions from the ground surface throughout UXO 1, and a Non-Time Critical Removal Action (NTCRA) from April 2010 through February 2011 to characterize and remove sources of subsurface geophysical anomalies along roads and beaches within UXO 1. Results from these removal actions, including air- and ground-based surveys (magnetometer and light detection and radar [LiDAR]), not only characterized the nature and extent of MEC and other munitions-related material, but also provided sufficient information to assess the explosive safety hazard associated with the site and to select the most appropriate locations for sampling as part of the environmental media characterization. The environmental characterization component of the RI was conducted from January to February 2011 using, in part, the nature and extent of MEC and other munitions-related material to assess the nature and extent of potential contamination and associated environmental and human health risks.

The major events of the RI field activities included:

- Removed vegetation to provide access for the MEC characterization and removal
- Conducted surface removal of MEC and other munitions-related material across the site

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

- Performed a geophysical survey over roads and beaches (plus 25-foot buffer zones on each side of the roads) to identify the locations of subsurface metallic items that may have been indicative of MEC; removed MEC and associated munitions-related material identified in the subsurface along roads and associated buffers (to a depth of 2 feet below ground surface [bgs]) and sandy beaches (to a depth of 4 feet bgs)
- Utilized the information gathered during the surface and subsurface characterization and removal activities to characterize the nature and extent of MEC present at UXO 1 and assess potential explosive safety risks
- Developed a conceptual model for the origin of and release mechanisms of contamination to environmental media from historical activities occurring adjacent to UXO 1
- Collected surface and subsurface soil, sediment, and surface water samples from five unique decision units (Beach, Lowland, Upland, Lagoon, and Lagoon Fringe, as shown in **Figures ES-3 through ES-5**) to provide sufficient information for assessing nature and extent of contamination and potential risks
- Performed quantitative human health and ecological risk assessments using the environmental media data

Physical Characteristics

- The topography of UXO 1 is relatively flat with a few high relief areas to the west and along the cliffs. The ground elevation at the site ranges between 0 and approximately 20 meters (0 to about 60 ft) amsl.
- A 9-acre unnamed lagoon partially surrounded by a narrow fringe of mangroves is present in the northwestern portion of UXO 1 (denoted as the ECA Lagoon in this RI Report). During the ecological setting evaluation of the lagoon, it was noted that a clay layer underlies the lagoon. This clay layer restricts or prevents hydraulic connection between the surface water in the lagoon and the underlying groundwater. This hydraulic barrier, as well as the physical barrier between the ocean and the lagoon, account for the lagoon not being tidally influenced and the presence of water in the lagoon being wholly or mostly the result of precipitation. During dry periods, the lagoon has been observed to dewater, with salts appearing on the lagoon flat. The lagoon has been isolated from the adjacent Bahia Playa Blanca by a stretch of forested upland since 1937, based on historic aerial photographs.
- The geology of UXO 1 is characterized as limestone and dolomite primarily exposed at the ground surface, and beach sand at Bahia Playa Blanca beach. The upland areas generally contain bedrock exposed at the surface, loose stones, and very shallow soil between exposed bedrock. Within the lowland areas, beach sands intermixed with limestone are encountered at the surface. Sediment within the lagoon is primarily silt and clay with limited organic matter.
- UXO 1 is located over 6 miles from the eastern boundary of the Esperanza aquifer. Groundwater within UXO 1 primarily occurs within the limestone and dolomite bedrock; however, groundwater was encountered within unconsolidated sand at a depth of 1 ft below ground surface adjacent to the lagoon. The groundwater table is likely encountered near sea level and tidally influenced. Groundwater discharge is to the ocean and is not believed to perennially discharge to the lagoon since the lagoon is periodically dry. Groundwater seeps were not observed along the cliff faces. The general groundwater geochemistry is likely brackish to saline and hard.

Nature and Extent of Contamination

MEC

- Because UXO 1 was not designated as a target area for ATG bombing and naval gunfire, the MEC and other munitions-related material densities identified were much lower than the adjacent UXO sites that make up the beaches, roads, and interior of the former LIA (UXOs 2, 3, and 4, respectively). Most of the MEC and other munitions-related material were likely a result of munitions directed toward the LIA that missed their intended target.

- A total of 1,308 MEC were removed from the ground surface at UXO 1. Although the density of material varied throughout UXO 1, the overall density averaged 10 surface MEC per acre. The estimated density of MEC removed from the western portion of UXO 1, near the boundary with the former LIA, was 16 surface MEC per acre, and the estimated density for the eastern portion of the site was 4.5 surface MEC per acre. **Figure ES-6** shows the locations of the MEC removed during the TCRA from UXO 1.
- In addition to the MEC, 784 MD and 10,487 RRD were removed from the ground surface during the TCRA. The density and distribution of the MD and RRD were similar to those of the MEC removed from the site.
- The general density and distribution of subsurface MEC identified during the subsurface NTCRA were consistent with those observed during the surface TCRA; the density of anomalies was highest in the vicinity of the former LIA and decreased eastward. A total of 1,177 discrete anomalies and 6 anomaly polygons were investigated during the NTCRA and a total of 3,539 metallic items were found within those anomalies. Intrusive sampling of the anomalies and polygons revealed MEC, MD, and RRD. A total of 97 MEC were found from 91 of the anomalies (discrete and polygon) identified by digital geophysical mapping (DGM). **Figure ES-7** shows the locations of the MEC removed during the NTCRA from UXO 1.

Environmental Media

Analytical data collected during the UXO 1 RI sampling provide the basis for the evaluation of the nature and extent of contamination in soil, surface water, and sediment. A total of 27 incremental surface soil (composed of 100 or more subsamples), 9 discrete surface soil, 15 discrete subsurface soil, 15 discrete sediment, and 5 discrete surface water samples were used to characterize site conditions (**Figures ES-3 through ES-5**). The sample locations were selected to conservatively represent the site in terms of exposure areas and media; distribution, density, and type of contaminants sources; and key migration pathways. They were also selected to provide sufficient spatial coverage across the site. In addition, 10 shallow soil background incremental samples were collected from lithologic areas similar to UXO 1, but within areas not potentially impacted by activities associated with UXO 1. Key findings were:

- Nitrobenzene was the only explosive detected in surface soil at UXO 1 above a screening criterion (**Figure ES-8**); it was detected in one sample (98 NJ μg/kg) above the soil screening level (SSL) of 6.8 μg/kg. However, the detected concentration is between about two and three orders of magnitude below risk-based screening criteria. This sample (4DU03) was collected along the boundary with the LIA. Other detected explosives, but at concentrations below screening criteria within surface soil, include 1,3,5-trinitrobenzene (one detection), 2,4,6-trinitrotoluene (one detection), 3,5-dinitroanaline (one detection), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (one detection), tetryl (one detection), and perchlorate (twelve detections). In all cases, the detected concentrations of the explosives are between about an order of magnitude and more than five orders of magnitude below all screening criteria.
- No explosives were detected in subsurface soil.
- No explosives were detected in surface water or sediment of the UXO 1 lagoon.
- Inorganic constituents detected above background concentrations (if available) and screening criteria in environmental media comprise:
  - **Soil** –arsenic, cobalt, chromium (hexavalent), iron, and selenium. However, because of their relatively low magnitude of background exceedances, relatively uniform distribution across the site, relatively minor contribution in munitions, and/or likely association with lithology present at UXO 1, the concentrations of all at UXO 1 are likely to be wholly or primarily attributable to background.
  - **Surface Water and/or Sediment** – aluminum, arsenic, barium, chromium, cobalt, copper, iron, manganese, selenium, thallium, and vanadium. Like the inorganics present in soil, multiple lines of evidence suggest the

concentrations of these inorganics in surface water and/or sediment of the lagoon are likely to be wholly or primarily attributable to background.

Contaminant Migration

- The conceptual site model (CSM) of UXO 1 showing the physical characteristics, contaminant sources, potential migration of contaminants, and the potential receptors and exposure pathways is shown in **Figure ES-9**.
- The potential sources of contamination at UXO 1 are munitions and munitions-related material, most likely from munitions directed toward the LIA that missed their intended target during naval gunfire and air-to-ground training activities. MEC at UXO 1 had the potential to release chemical contaminants to environmental media, from historical detonations and from the deterioration of MEC and related munitions scrap.
- The low concentrations of explosives in surface soil, the absence of explosives in subsurface soil and the lagoon surface water and sediment, and the presence of inorganics that are wholly or primarily attributable to background suggest the potential for contaminant migration from wind erosion, surface runoff, and leaching to and migration with groundwater is insignificant.

Land Use

- UXO 1 is part of the National Wildlife Refuge for which no public access or groundwater use is intended; however, limited work by USFWS (refuge management) and the U.S. Coast Guard (beacon maintenance) may be conducted. Due to the presence of high cliffs and shallow coral reefs surrounding the ECA and the presence of the LIA to the west, the potential for trespassing at UXO 1 is low.

Human Health Risk Assessment

- Potential current/future receptors evaluated in the HHRA consisted of USFWS workers engaged in a variety of refuge management and law enforcement activities, trespassers, and Coast Guard workers. Conservative exposure pathways included (variously based on the receptor) ingestion, dermal contact, and inhalation of chemicals of potential concern (COPCs) in soil; ingestion and dermal contact of COPCs in sediment; and dermal contact of COPCs in surface water.
- No chemicals of concern (COCs) were identified based on human exposure to COPCs in site soil, sediment or surface water at UXO 1. Therefore, no unacceptable human health risks are present at UXO 1.

Ecological Risk Assessment

- The ERA evaluated both terrestrial and aquatic habitats. In summary, no COCs were identified for individual plant and animal receptor exposure to surface soil, surface water, or sediment exposures at UXO 1. Similarly, no COCs were identified for food web exposures. Thus, no unacceptable risks to ecological receptors are present at UXO 1.

Conclusions and Recommendations

A TCRA was completed across UXO 1 during which surface MEC and other munitions-related items were characterized and removed. Additionally, ground- (magnetometer) and aerial-based (LiDAR and aerial magnetometer) surveys were conducted to determine the presence and estimate the quantity of munitions-related material in the subsurface across UXO 1. Subsurface MEC and other munitions-related material were removed along roads and beaches of UXO 1. As a result of these activities, the nature and extent of MEC and associated munitions-related material were sufficiently characterized in order to conduct explosive risk evaluations. These evaluations indicate the explosive safety risk along the beaches is low and within the remaining terrestrial areas is moderate.

Based on the CSM for the site and historical information, including the information gathered during the MEC characterization and removal activities, sampling was performed across UXO 1 to characterize the nature and extent of contamination in environmental media. The sample locations were selected to conservatively represent

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

the site in terms of exposure areas and media; distribution, density, and type of contaminants sources; key migration pathways; and sufficient spatial distribution. Analytical data for the environmental media samples suggest explosives and inorganics contamination in soil at the ECA is negligible. This is further emphasized by the fact that the incremental and discrete soil samples represented approximately 900 analyses, in which there were only 16 explosive detections, all but one of which are orders of magnitude below screening criteria. Quantitative human health and ecological risk assessments performed using the environmental media samples collected at the site indicate there is no unacceptable risks to potential human or ecological receptors at the site.

Based on the above information, the following path forward is recommended for UXO 1:

- No further investigation is warranted; the nature and extent of MEC, other munitions-related material, and associated contamination have been sufficiently delineated to make remedial action determinations.
- No action is warranted to address potential human and ecological receptor exposure to chemical constituent concentrations in environmental media.
- A feasibility study is warranted to evaluate remedial alternatives to address the explosive safety risk associated with the ongoing potential presence of MEC at the site.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

Resumen Ejecutivo

Introducción

Este informe de Investigación para la Remediación (RI por sus siglas en inglés) presenta los resultados del RI que se llevó a cabo para caracterizar la naturaleza y extensión de la contaminación y evaluar los riesgos potenciales a la salud humana y al ambiente en el Área de Conservación del Este (ECA por sus siglas en inglés), la que ha sido designada como UXO 1, y que se localiza en el antiguo Campo de Adiestramiento Naval de Vieques (VNTR por sus siglas en inglés) en la porción más hacia el este de Vieques, Puerto Rico (Figuras ES-1 y ES-2).

UXO 1 tiene un tamaño de 133 acres, fue establecida como un área de conservación en 1983 y forma parte del Refugio Nacional de Vida Silvestre de Vieques; en esta área no se planifica permitir el ingreso del público o el uso del agua subterránea. No se conoce que UXO 1 haya sido utizado como una área de blanco para municiones; sin embargo, el sitio está localizado junto al Área de Impacto con Bala Viva (LIA por su siglas en inglés) (Sitios UXO 2, 3 y 4) en donde sí se llevaron a cabo actividades de adiestramiento con armas navales de aire a tierra (ATG por sus siglas en inglés) desde los años 70 hasta el año 2003. Por lo que, las municiones y explosivos de preocupación (MEC por sus siglas en inglés) y otros materiales relacionados a municiones que fueron identificados en UXO 1 posiblemente provienen de municiones que fueron directamente dirigidas al LIA y que erraron su blanco objetivo.

Las actividades históricas en el LIA tienen el potencial de dejar escapar MEC y otros materiales relacionados a municiones en UXO 1, lo que, a su vez, tiene el potencial de que contaminantes químicos provenientes de detonaciones y del deterioro de MEC y de los escombros relacionados a municiones lleguen a los medios ambientales. Por lo que, los objetivos de este RI son:

- Caracterizar adecuadamente la naturaleza y la extensión de MEC y de otros materiales relacionados a municiones.
- Evaluar el riesgo potencial relacionado con la seguridad de explosivos asociado con el sitio (en base a las condiciones del sitio y el uso de los terrenos actual y futuro después de llevar a cabo la acción de remoción interina
- Caracterizar adecuadamente la naturaleza y la extensión de la contaminación potencial del suelo, agua superficial y sedimento, con énfasis especial en al área con el mayor potencial de contaminación
- Evaluar los riesgos potenciales que presenta la potencial contaminación a la salud humana y al ambiente

Actividades de Investigación para la Remediación

El RI de UXO 1 fue implementado a través de dos investigaciones separadas pero relacionadas – la primera enfocada en los MEC y la otra en los contaminante químicos en varios medios ambientales principalmente asociados con las actividades históricas relacionadas a municiones. Se caracterizó la naturaleza y extensión de MEC y otros materiales relacionados a municiones como parte de dos acciones de remoción interinas: una Acción de Remoción de Tiempo Crítico (TCRA por sus siglas en inglés) de enero a diciembre 2008 para caracterizar y remover municiones de la superficie del terreno a través de UXO 1, y una Acción de Remoción de Tiempo No Crítico (NTCRA por sus siglas en inglés) desde abril de 2011 hasta febrero de 2011 para caracterizar y remover las fuentes de las anomalías geofísicas debajo de la superficie a lo largo de los caminos y playas dentro de UXO 1. Los resultados de estas acciones de remoción, que incluyeron investigaciones de aire y terrestres (magnetómetro y detección liviana y radar [LiDAR]) por sus siglas en inglés), no sólo caracterizaron la naturaleza y extensión de MEC y otros materiales relacionados a municiones, sino que también proveyeron suficiente información para evaluar la amenaza relacionada a la seguridad de explosivos asociada con el sitio y para seleccionar las localidades de muestreo más adecuadas como parte de la caracterización de los medios ambientales. El componente de la caracterización ambiental del RI se llevó a cabo de enero a febrero de 2011 usando, en parte, la naturaleza y extensión de MEC y de

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

otros materiales relacionados a municiones para evaluar la naturaleza y extensión de la contaminación potencial y los riesgos ambientales asociados a la salud humana y al ambiente.

Los eventos principales de las actividades de campo durante el RI incluyeron:

- Remoción de la vegetación para proveer acceso para la caracterización y remoción de MEC
- Se llevó a cabo la remoción de MEC de la superficie y de otros materiales relacionados a municiones a través del sitio
- Se llevó a cabo monitoreros geofísicos sobre los caminos y playas (además de una zona de amortiguamiento de 25 pies a cada lado de los caminos) para identificar la ubicación de los artículos metálicos debajo de la superficie que pudieran indicar la presencia de MEC; se removió MEC y materiales asociados a municiones debajo de la superficie a lo largo de los caminos y las zonas de amortiguamiento asociadas (a una profundidad de dos pies debajo de la superficie del terreno [bgs]) y en las playas arenosas (a una profundidad de 4 pies bgs)
- Se utilizó la información que se recopiló durante las actividades de caracterización y remoción debajo de la superficie para caracterizar la naturaleza y extensión de MEC presente en UXO 1 y para evaluar el potencial de que riesgos a la seguridad relacionada a explosivos estén presentes
- Se desarrolló un modelo conceptual para evaluar el origen y la dispersión de contaminantes a medios ambientales provenientes de las actividades que ocurrieron adyacentes a UXO 1
- Se obtuvieron muestras de suelo superficial y subsuelo, sedimento, y agua superficial de cinco unidades de decisión específicas (Playa, Parte Baja, Parte Alta, Laguna y Borde de la Laguna, como se muestra en las **Figuras ES-3 a ES-5**) para obtener la suficiente información para evaluar la naturaleza y extensión de la contaminación y los riesgos potenciales
- Se realizaron evaluaciones cuantitativas de los riesgos a la salud humana y riesgos ecológicos usando los datos de los medios ambientales

Características Físicas

- La topografía de UXO 1 es relativamente plana con pocas áreas con relieve elevado hacia el oeste a lo largo de los acantilados. La elevación del terreno en el sitio varía de 0 hasta aproximadamente 20 metros (de 0 hasta 60 pies) sobre el nivel del mar (amsl por sus siglas en inglés).
- Una laguna sin nombre de 9-acres parcialmente rodeada por una estrecha franja de mangles está presente en la porción noroeste de UXO 1 (denominada como laguna EAC en este Informe RI). Durante la evaluación del entorno ecológico de la laguna, se anotó que una capa de arcilla cubre el fondo de la laguna. Esta capa de arcilla restringe o previene la conexión hidráulica ente la superficie del agua en la laguna y el agua subterránea hacia abajo. Esta barrera hidráulica, así como la barrera física entre el océano y la laguna, ayuda a que la laguna no esté influenciada por la marea, por lo que el agua es el resultado en su totalidad o en su mayoría a la precipitación. Durante períodos de sequía, la laguna se observado sin agua, con la presencia de sal de roca en el fondo de la laguna. En base a fotografías históricas aéreas se conoce que desde 1937, la laguna ha estado aislada de Bahía Playa Blanca por una porción elevada con vegetación que se encuentra adhiacente.
- La geología de UXO 1 está caracterizada por una piedra caliza y dolomite que principalmente está expuesta en la superficie del terreno, y una playa arenosa en la playa de Bahía Playa Blanca. Las áreas elevadas generalmente contienen fondo de roca expuesta a la superficie, piedras sueltas, y tierra poco profunda entre los fondos de roca expuestas. Dentro de las áreas bajas, las playas arenosas se mezclan con la piedra caliza que se encuentra en la superficie. El sedimento de la laguna es principalmente limo y arcilla con poca materia orgánica.
- UXO 1 se localiza a más de 6 millas del límite este del acuífero de Esperanza. El agua subterránea dentro de UXO 1 ocurre principalmente dentro de la piedra caliza y de roca dolomite; sin embargo el agua subterránea se encontró dentro de arena no compactada a una profundidad de 1 pie debajo de la superficie adyacente a la

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

laguna. El nivel del agua subterránea es posible que se encuentre cerca del nivel del mar y puede estar influenciado por la marea. La descarga del agua subterránea es hacia el océano y no se cree que ha habido una descarga potencial en laguna, ya que la laguna esta periódicamente seca. No se observaron filtraciones de agua subterránea a lo largo de las caras de los acantilados. La geoquímica general del agua subterránea es posible que sea de salobre a salina y dura.

Naturaleza y Extensión de la Contaminación

MEC

- Debido a que UXO 1 no fue designada como un área blanco para bombardeos y prácticas con armas navales ATG, las densidades de MEC y otros materiales relacionados a municiones identificadas fueron mucho más bajas en los sitios UXO adyacentes que conforman las playas, caminos, interior de la antigua LIA (UXOs 2, 3, y 4, respectivamente). La mayoría de MEC y otro material relacionado a municiones presente es posible que sea el resultado de municiones que fueron dirigidas al LIA pero que erraron su blanco objetivo.
- Se removieron un total de 1,308 MEC de la superficie del terreno en UXO 1. Aunque la densidad del material fue variable a través del sitio, la densidad total tuvo un promedio de 10 MEC sobre la superficie por acre. La densidad estimada de MEC removido de la porción oeste de UXO 1, cerca del límite con la antigua LIA, fue de 16 MEC sobre la superficie por acre, y la densidad estimada para la porción este del sitio fue de 4.5 MEC sobre la superficie por acre. La **Figura ES-6** muestra las localidades de MEC removidas durante la acción TCRA de UXO 1.
- Además de MEC, durante la acción TCRA se removieron 784 escombros de municiones (MD por sus siglas en inglés) y 10,487 artículos relacionados al campo de tiro (RRD por sus siglas en inglés) de la superficie del terreno. La densidad y distribución de MD y RRD fueron similares a la de los MEC removidos del sitio.
- La densidad y distribución general de MEC debajo de la superficie que se identificó durante la acción NTCRA debajo de la superficie fueron consistentes con aquellas observadas durante la acción TCRA sobre la superficie; la densidad de las anomalías fue mayor en la vecindad de la antigua LIA y disminuyó hacia el este. Durante la acción NTCRA se investigaron un total de 1,177 de anomalías discretas y 6 polígonos de anomalías y se removieron un total de 3,539 artículos metálicos de estas anomalías. Un muestreo intrusivo de las anomalías y polígonos revelaron la presencia de MEC, MD, y RRD. Se encontró un total de 97 MEC en 91 de las anomalías (discretas y polígonos) identificadas por un muestreo geofísico (DGM por sus siglas en inglés). La **Figura ES-7** muestra la ubicación de MEC removidos durante la acción NTCRA de UXO 1.

Medios Ambientales

Los datos analíticos obtenidos durante el muestreo RI de UXO 1 proveen las bases para la evaluación de la naturaleza y extensión de la contaminación en suelos, agua superficial, y sedimento. Para caracterizar las condiciones del sitio se usaron un total de 27 muestras de suelo en incrementos (compuestas de 100 o más submuetras), 9 muestras discretas de suelo superficial, 15 muestras discretas de subsuelo, 15 muestras discretas de sedimento, y 5 muestras discretas de agua superficial (Figuras ES-3 a ES-5). La ubicación de las muestras fue seleccionada para que conservadoramente representen el sitio en términos de áreas expuestas y medios; distribución, densidad, y tipo de las fuentes de contaminantes; y vías de migración principales. También fueron seleccionadas para que provean una cubierta espacial adecuada a través del sitio. Además, se obtuvieron 10 muestras en incrementos de suelo de trasfondo poco profundo de áreas litológicas similares a UXO 1, pero dentro de áreas que no han sido potencialmente impactadas por actividades asociadas a UXO 1. Los resultados principales fueron:

- Nitrobenceno fue el único explosivo detectado en el suelo de superficie en UXO 1 sobre los criterios de evaluación (**Figura ES-8**); fue detectado en una muestra (98 NJ μg/kg) sobre el nivel de evaluación de suelos (SSL por sus siglas en inglés) de 6.8 μg/kg. Sin embargo, la concentración detectada está entre dos o tres órdenes de magnitud por debajo de los criterios de evaluación basados en riesgo. Esta muestra (4DU03) se

obtuvo a lo largo de los límites con el LIA. Otros explosivos detectados, aunque en concentraciones por debajo de los criterios de evaluación en los suelos de superficie, incluyen 1,3,5-trinitrobenzeno (una detección), 2,4,6-trinitrotolueno (una detección), 3,5-dinitroanilina (una detección), octahidro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (una detección), tetril (una detección), y perclorato (doce detecciones). En todos los casos, las concentraciones de explosivos detectadas están dentro de una orden de magnitud y más de cinco órdenes de magnitud por debajo de los criterios de evaluación.

- No se detectaron explosivos en el subsuelo
- No se detectaron explosivos en el agua superficial o sedimentos en la laguna de UXO 1
- Lo compuestos inorgánicos (metales) que se detectaron sobre las concentraciones de trasfondo (de estar disponibles) y los criterios de evaluación en los medio ambientales son:
  - **Suelo** –arsénico, cobalto, cromo (hexavalente), hierro, y selenio. Sin embargo, debido a la magnitud relativamente baja de las excedencias de trasfondo, su distribución relativamente uniforme a través del sitio, la relativamente baja contribución de municiones, y/o su posible asociación con la litología que se encuentra en UXO 1, las concentraciones de todos los compuestos en este sitio es posible que en su totalidad o principalmente son atribuidos al trasfondo.
  - **Agua Superficial y/o Sedimento** – aluminio, arsénico, bario, cromo, cobalto, cobre, hierro, manganeso, selenio, talio, y vanadio. Así como estos inorgánicos están presentes en el suelo, líneas de evidencia múltiples sugieren que las concentraciones de estos metales en el agua superficial y/o sedimentos de la laguna es posible que en su totalidad o principalmente son atribuidos al trasfondo.

Migración de Contaminantes

- El modelo conceptual del sitio (CMS por sus siglas en inglés) UXO 1 que muestra las características físicas, las fuentes de contaminación, la migración potencial de contaminantes, los receptores y las vías de exposición se muestran en la **Figura ES-9**.
- Las fuentes de contaminación potenciales en UXO 1 son municiones y material relacionado a municiones, que provienen posiblemente de municiones que fueron dirigidas al LIA y que no llegaron a su blanco objetivo durante las actividades de adiestramiento con municiones ATG. Los MEC en UXO 1 tienen el potencial de dejar escapar contaminantes a los medios ambientales, provenientes de detonaciones históricas, del deterioro de MEC y de escombros de municiones asociados.
- La bajas concentraciones de explosivos en el suelo superficial, la ausencia de explosivos en el subsuelo y en el agua superficial y sedimentos de laguna, y la presencia de inorgánicos que en su totalidad o principalmente son atribuidos al trasfondo, sugieren que el potencial de migración de contaminantes resultado de la erosión por el viento, escorrentía de la superficie, lixiviación y la migración del agua subterránea es insignificante.

Uso de los terrenos

- UXO 1 forma parte del Refugio Nacional de Vida Silvestre donde no hay intención de permitir el ingreso de público o el uso del agua subterránea; sin embargo, se pueden planificar actividades limitadas del Servicio de Pesca y Vida Silvestre (USFWS por sus siglas en inglés) (administradores del refugio) y de la Guardia Costera de los EE.UU. (mantenimiento de la baliza -faro). Debido a la presencia de acantilados elevados y arrecifes de coral poco profundos que rodean al ECA y la presencia del LIA en el oeste, el potencial de que personas ingresen sin autorización a UXO 1 es baja.

Evaluación de Riesgos a la Salud Humana (HHRA por sus siglas en inglés)

- Los receptores potenciales actuales/futuros evaluados en el HHRA son los trabajadores de USFWS que realizan una variedad de actividades de administración del refugio y de cumplimento de la ley, personas que ingresan sin autorización, y trabajadores de la Guardia Costera. Las vías de exposición conservadoras incluyen (diversamente dependiendo del receptor) ingestión, contacto dérmico, e inhalación de sustancias químicas de

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

preocupación potencial (COPCs por sus siglas en inglés) en el suelo; ingestión y contacto dérmico de COPCs en sedimentos; y contacto dérmico de COPCs en el agua superficial.

No se identificaron sustancias químicas de preocupación (COCs por sus siglas en inglés) en base a la exposición de personas a los COPCs a los suelo del sitio, sedimentos o agua superficial en UXO1. Por lo que, en UXO 1 no están presentes riesgos inaceptables para la salud humana.

Evaluación de Riesgos Ecológicos (ERA por sus siglas en inglés)

- La ERA evaluó tanto los hábitats terrestres como los acuáticos. En resumen, no se identificaron COCs para la explosión de receptores, plantas o animales, al suelo superficial, agua superficial, o sedimentos en UXO 1. De manera similar, no se identificaron COCs para la exposición a la red alimenticia. Por lo que, riesgos ecológicos no aceptables no están presentes en UXO 1.

Conclusiones y Recomendaciones

Se terminó una acción TCRA en UXO 1 durante la cual se identificaron y removieron MEC y otros artículos relacionados a municiones. Adicionalmente, se llevaron a cabo investigaciones de suelo (usando un magnetómetro) e investigaciones aéreas (usando LiDAR y un magnetómetro aéreo) para determinar la presencia y estimar la cantidad de material relacionado con municiones existente en la superficie de UXO 1. Los MEC debajo de la superficie y otros materiales relacionados fueron removidos de las carreteras y playas de UXO 1. Como resultado de estas actividades, la naturaleza y extensión de MEC y material relacionado a municiones, fue caracterizado de forma adecuada a fin de poder llevar a cabo evaluaciones de riesgo relacionados a la seguridad de explosivos. Estas evaluaciones indican que los riesgos relacionados a la seguridad de explosivos en las playas son bajos y en el terreno restante son moderados.

Basado en el CSM para este sitio y la información histórica, incluyendo información obtenida durante las actividades de caracterización y remoción de MEC, se llevó a cabo un muestreo en UXO 1 para caracterizar la naturaleza y extensión de la contaminación en medios ambientales. Las ubicaciones de las muestras fueron seleccionadas de manera conservadora para que representen el sitio en términos de áreas de exposición y medios; distribución, densidad y tipo de las fuentes de contaminación; vías de exposición claves; y una distribución espacial adecuada. Los datos analíticos de las muestras de los medios ambientales sugieren que la contaminación de suelo relacionada a explosivos y metales en el ECA es insignificante. Esto se refuerza con el hecho de que las muestras incrementales y discretas de suelo representaron aproximadamente 900 análisis, en los cuales sólo se detectaron 16 detecciones de explosivos, donde todos menos uno presentaban órdenes de magnitud por debajo de los criterios de evaluación. Las evaluaciones cuantitativas de los riesgos a salud humana y riesgos ecológicos, que se realizaron usando las muestras de medios ambientales obtenidos en el sitio, indican que no existen riesgos inaceptables en el sitio para receptores humanos o ecológicos potenciales.

Basado en la información anterior, se recomiendan los siguientes pasos para UXO 1:

- No amerita se lleve a cabo ninguna investigación futura; la naturaleza y extensión de MEC, otros materiales relacionados a municiones, y su contaminación asociada han sido suficientemente delineados para determinar las acciones de remediación necesarias.
- No amerita se lleve a cabo ninguna acción para atender el potencial exposición de receptores humanos o ecológicos a concentraciones de sustancias químicas en medios ambientales.
- Si amerita se lleve a cabo un estudio de factibilidad para evaluar las alternativas de remediación para atender los riesgos a la seguridad de explosivos asociados con la presencia remanente de MEC en el sitio.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.
NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

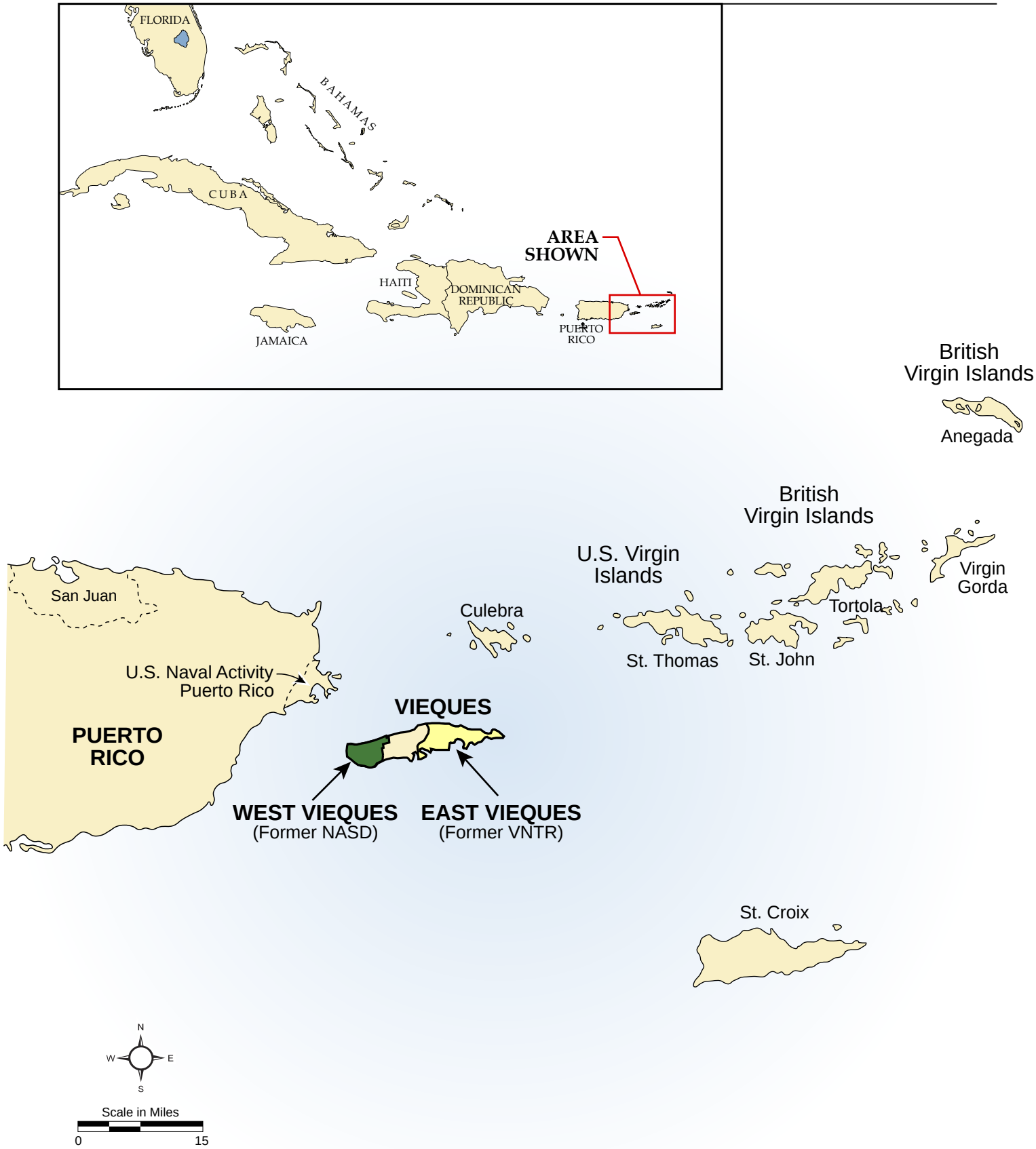


FIGURE ES-1
Regional Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

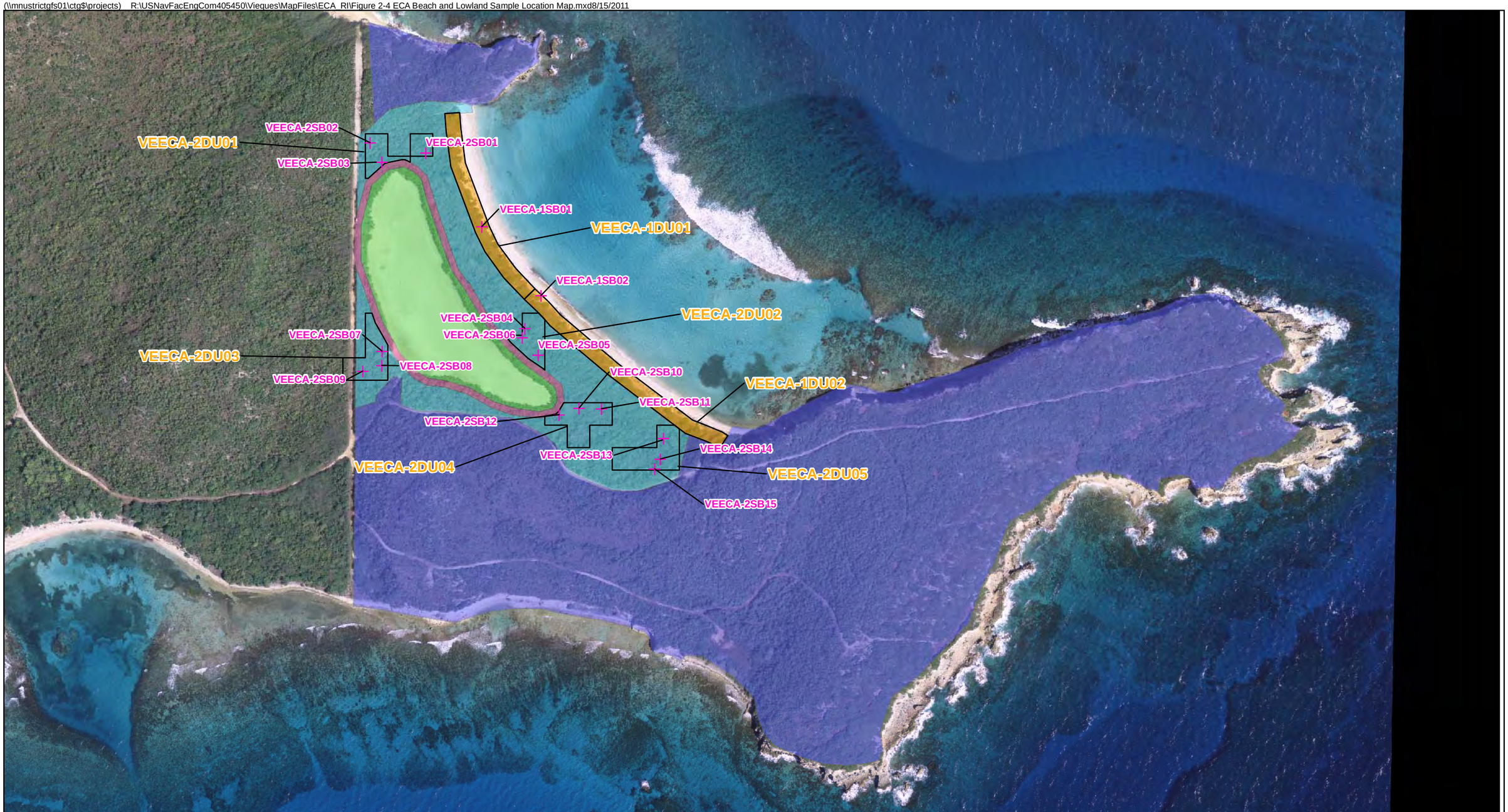
N
W E
S

0 2,000 4,000 8,000
Feet

FIGURE ES-2
ECA Site Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-4 ECA Beach and Lowland Sample Location Map.mxd8/15/2011



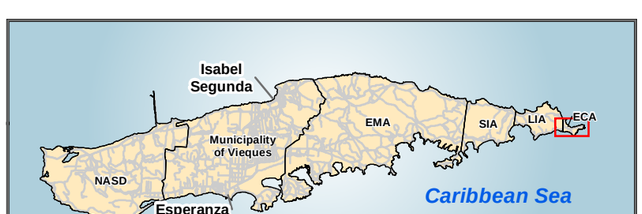
Legend

- Subsurface Soil Sample
- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

Name

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

0 500 1,000 Feet

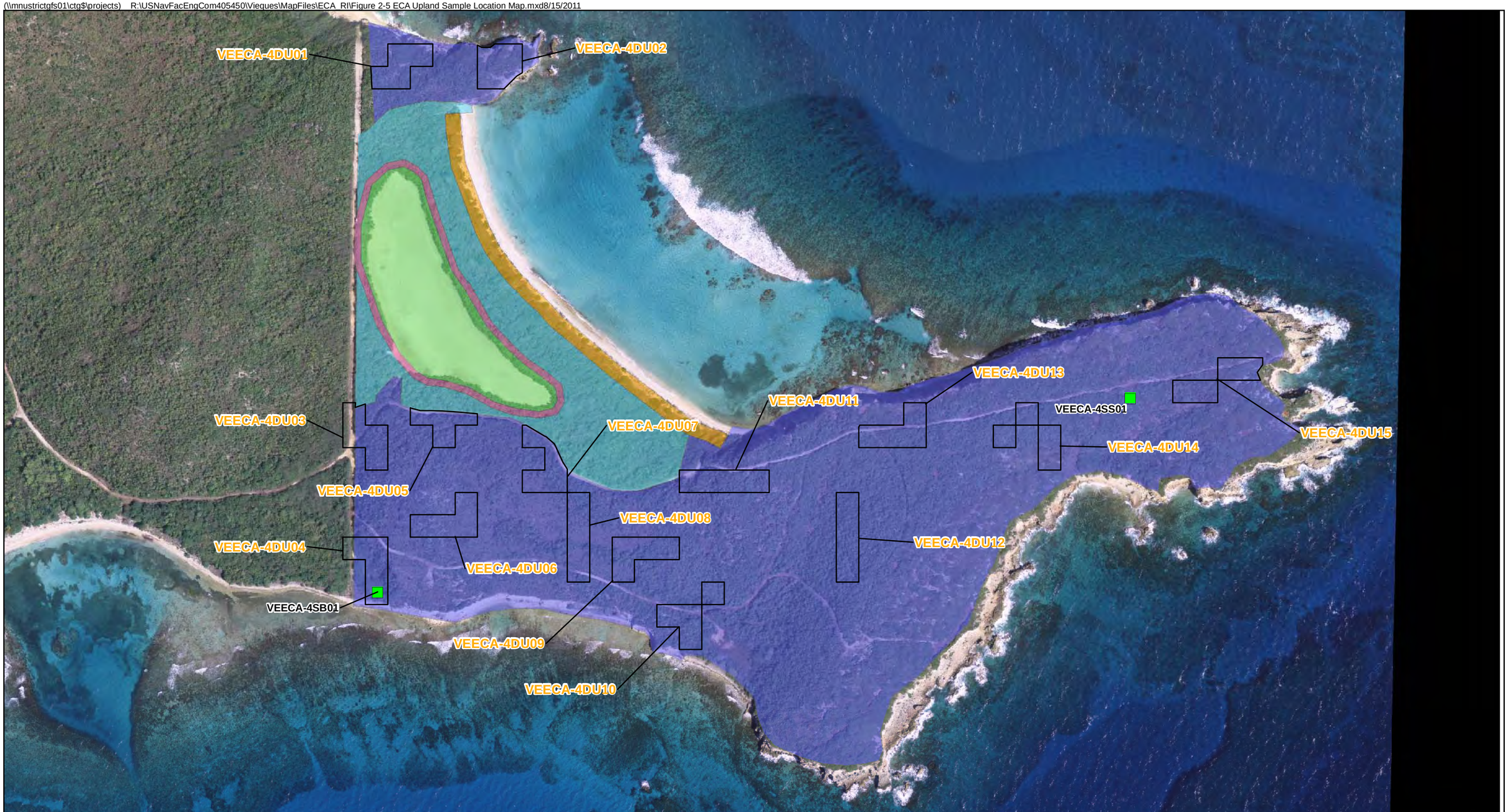
2007 Aerial Image

FIGURE ES-3
ECA Beach and Lowland Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

ES060211161657TPA

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-5 ECA Upland Sample Location Map.mxd8/15/2011

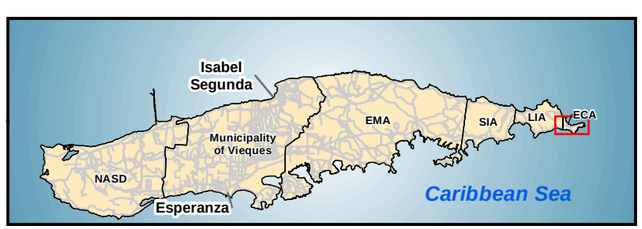


Legend

- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

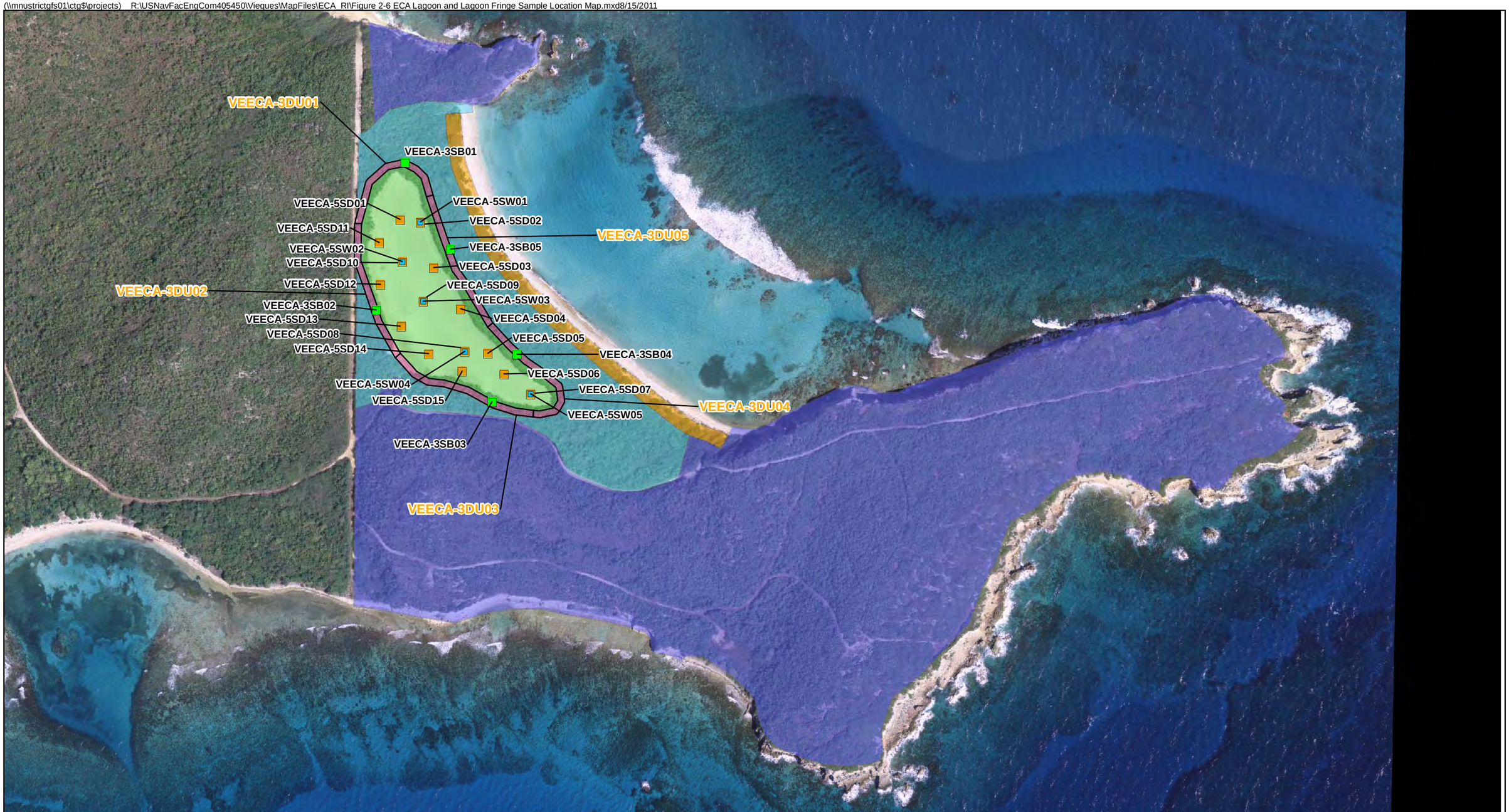
0 500 1,000 Feet

2007 Aerial Image

FIGURE ES-4
ECA Upland Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-6 ECA Lagoon and Lagoon Fringe Sample Location Map.mxd8/15/2011

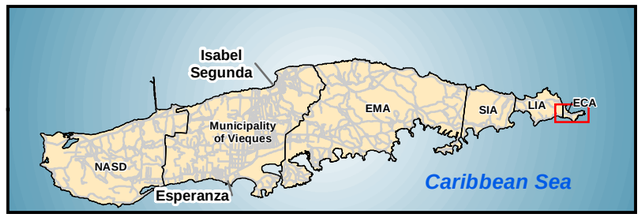


Legend

- Sediment Sample
- Surface Water Sample
- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

0 200 400 800 Feet

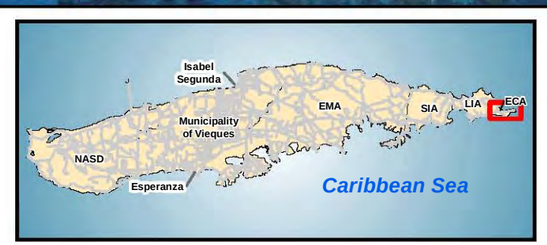
2007 Aerial Image

FIGURE ES-5
ECA Lagoon and Lagoon Fringe Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL®

(\\mnustrictqfs01\ctq$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_4-1_MEC_Items_Recovered_During_TCRA.mxd1/4/2012

- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- Submunitions
- MD (Scrap)
- RRD (Scrap)
- ECA Boundary



N
W E
S

0 200 400
Feet

Figure ES-6
MEC, MD and RRD Recovered During TCRA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictqfs01\ctq$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_4-2_MEC_Items_Recovered_During_NTCRA.mxd1/4/2012

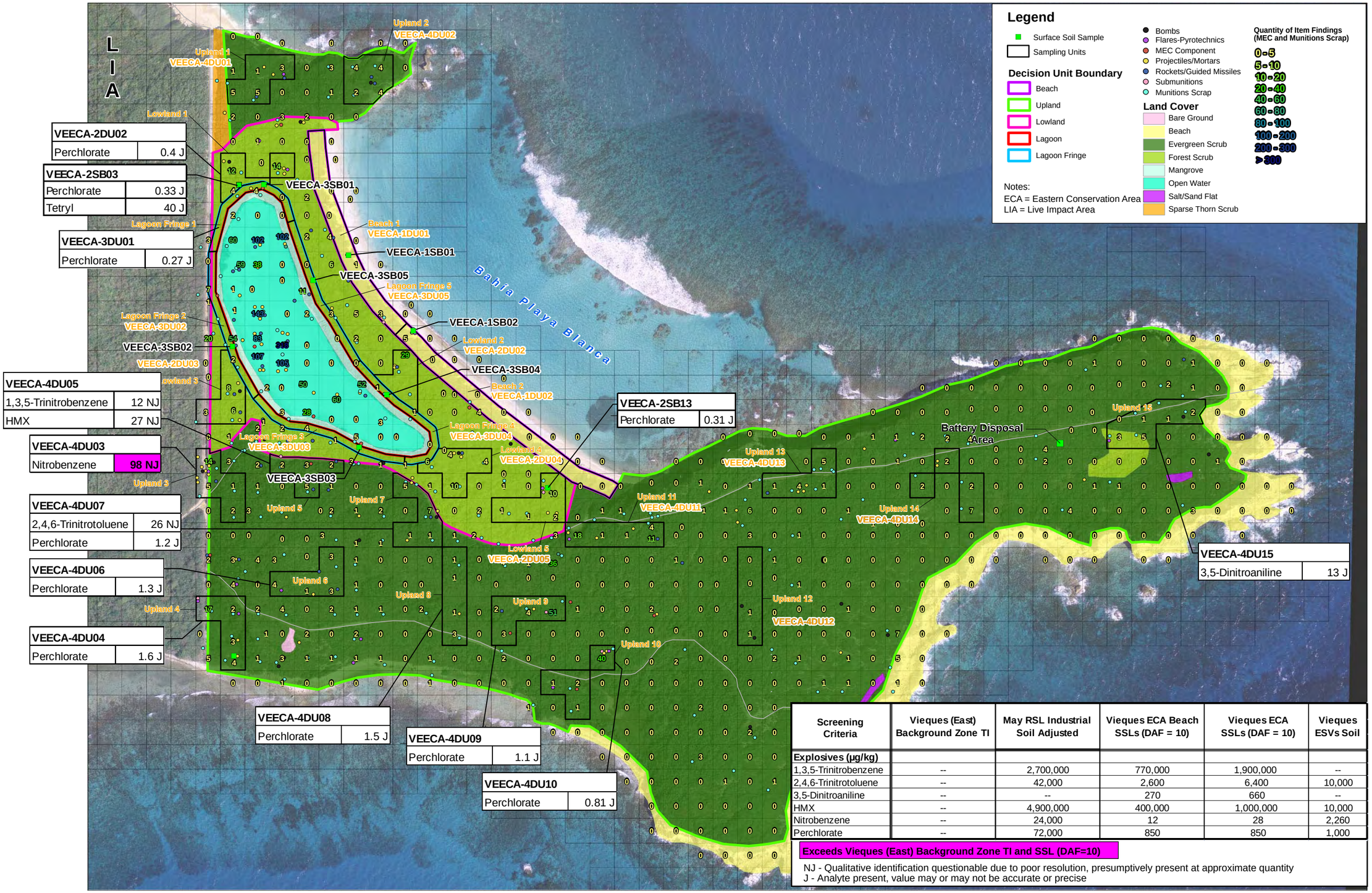
- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- MD (Scrap)
- RRD (Scrap)
- ECA Boundary

N
W E
S

0 200 400
Feet

Figure ES-7
MEC, MD and RRD Recovered During NTCRA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



Screening Criteria	Vieques (East) Background Zone TI	May RSL Industrial Soil Adjusted	Vieques ECA Beach SSLs (DAF = 10)	Vieques ECA SSLs (DAF = 10)	Vieques ESVs Soil
Explosives (µg/kg)					
1,3,5-Trinitrobenzene	--	2,700,000	770,000	1,900,000	--
2,4,6-Trinitrotoluene	--	42,000	2,600	6,400	10,000
3,5-Dinitroaniline	--	--	270	660	--
HMX	--	4,900,000	400,000	1,000,000	10,000
Nitrobenzene	--	24,000	12	28	2,260
Perchlorate	--	72,000	850	850	1,000

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
J - Analyte present, value may or may not be accurate or precise

FIGURE ES-8
Explosives Detections and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

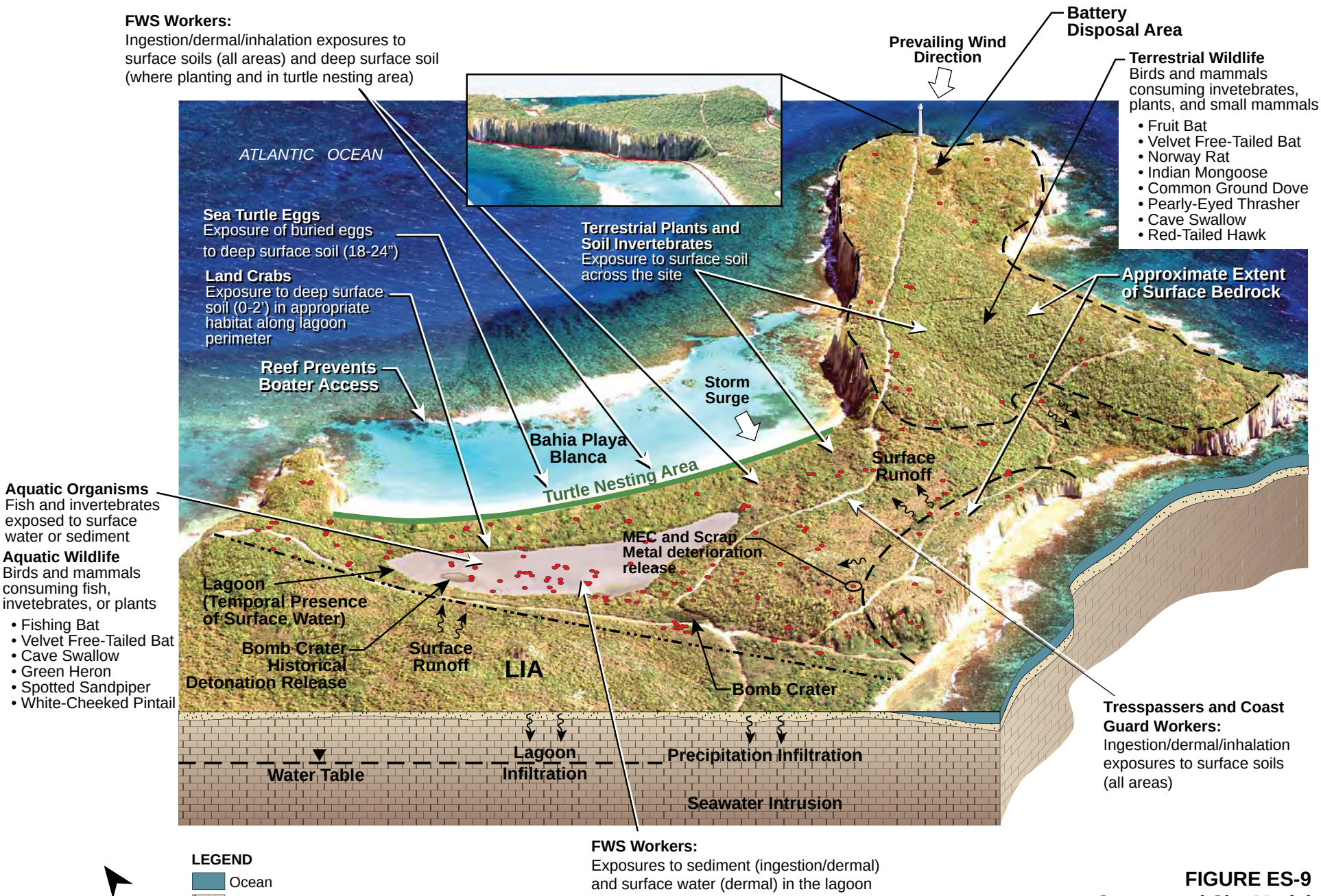


FIGURE ES-9
Conceptual Site Model
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

ES060211161657TPA ES-9 ECA Conceptual Site Model-rev9.ai mstuart

SECTION 1

Introduction

This Remedial Investigation (RI) report presents the results of the RI conducted to characterize the nature and extent of contamination and to assess potential risks to human health and the environment at the Eastern Conservation Area (ECA), designated as UXO 1, located at the former Vieques Naval Training Range (VNTR) in the easternmost portion of Vieques, Puerto Rico (**Figures 1-1 and 1-2**). Historical records indicate UXO 1 was not used as operational target area for munitions; however, the site is located adjacent to the Live Impact Area (LIA), where naval gunfire and air-to-ground training activities occurred from the mid 1960s through 2003. Therefore, munitions-related material found within UXO 1 are likely the result of overshot associated with training activities at the LIA.

This report is prepared under the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Atlantic Division, Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62470-08-D-1000, Contract Task Order 037, for submittal to NAVFAC Atlantic Division, United States Environmental Protection Agency (USEPA) Region 2, the Commonwealth of Puerto Rico Environmental Quality Board (PREQB), and the United States Fish and Wildlife Service (USFWS). The Navy, USEPA, PREQB, and USFWS work jointly as the former VNTR Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program (ERP) Technical Subcommittee.

1.1 Objectives and Approach

The objectives of this RI were to:

- Sufficiently characterize the nature and extent of MEC and other munitions-related material
- Assess the explosive safety risk associated with the site (based on the post-interim removal action site conditions and current and future land use)
- Sufficiently characterize the nature and extent of potential contamination within soil, surface water, and sediment, with special emphasis on areas with the highest potential for contamination
- Assess the potential risks posed by potential contamination to human health and the environment.

The UXO 1 RI was implemented through two separate, but related investigations – one focusing on munitions and explosives of concern (MEC) and one focusing on chemical contaminants in the various environmental media primarily associated with historical munitions-related activities. The nature and extent of MEC and other munitions-related material were characterized as part of two interim removal actions: a Time-Critical Removal Action (TCRA) from January through December 2008 to characterize and remove munitions from the ground surface throughout UXO 1, and a Non-Time Critical Removal Action (NTCRA) from April 2010 through February 2011 to identify and remove sources of subsurface geophysical anomalies along roads and beaches within UXO 1. Results from these removal actions, including air- and ground-based surveys, not only characterized the nature and extent of MEC and other munitions-related material, but also provided sufficient information to assess the explosive safety hazard associated with the site and to select the most appropriate locations for sampling as part of the environmental media characterization. The environmental characterization component of the RI was conducted from January to February 2011 using, in part, the nature and extent of MEC and other munitions-related material to assess the nature and extent of potential contamination and associated environmental and human health risks.

1.1.1 Munitions and Explosives of Concern Investigation

The specific approach for the MEC component of the RI was as follows:

- Remove vegetation to provide access for the MEC characterization and removal
- Conduct a surface removal of MEC identified over the site
- Perform a geophysical survey over selected roads and beaches (plus 25-foot buffer zones on each side of the roads) to identify the locations of subsurface metallic items that may be indicative of MEC; remove MEC and

associated munitions-related material identified in the subsurface along roads and associated buffers (to a depth of 2 feet below ground surface [bgs]) and sandy beaches (to a depth of 4 feet bgs)

- Utilize the information gathered during the surface and subsurface characterization and removal activities to characterize the nature and extent of MEC present at UXO 1 and assess potential explosive safety risks
- Manage all MEC, range-related debris (RRD), and munitions debris (MD) recovered during the investigation activities to final disposition
- Create a database containing relevant details about all the material recovered during the investigation activities to support nature and extent characterization, explosive safety risk calculations, and, as warranted, evaluation of remedial alternatives

1.1.2 Environmental Investigation

The specific objectives and approach of the environmental characterization component of the RI were as follows:

- Review and incorporate relevant site and historical information and results from previous investigations at UXO 1, primarily from the MEC activities described in the previous subsection
- Collect surface and subsurface soil, surface water, and sediment samples to sufficiently delineate the nature and extent of contamination, focusing on areas with the highest potential for contamination at the site. Surface soil sampling was conducted using the incremental sampling strategy and approach, in general accordance with guidance document prepared by the US Army Corps of Engineers (USACE) titled *Interim Guidance 09-02, Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program* (USACE, 2009). Discrete deeper surface soil, subsurface soil, sediment, and surface water samples were collected in accordance with the applicable Vieques SOPs (CH2M HILL, 2010).
- Conduct a qualitative ecological survey of the ECA Lagoon.
- Quantitatively assess the potential human health and ecological risks associated with exposure to contaminated site media, where identified.

1.2 Site Background

This subsection provides a general summary of the former VNTR and UXO 1, including site descriptions and environmental history.

Planning documents that provide the basis for the implementation of this RI, including the quantitative risk assessments, are provided below:

- *Final Time Critical Removal Action/Interim Measures Work Plan, Surface Munitions and Explosives of Concern at Munitions Response Area-Live Impact Area, Munitions Response Sites 1 through 8, 13, 15 through 20, and 29 through 31, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico (CH2M HILL, 2005). This document is hereafter referred to as the TCRA/IM Work Plan.*
- *Final Time Critical Removal Action/Interim Measures Work Plan Amendment, Surface Munitions and Explosives of Concern at Munitions Response Area-Eastern Conservation Area and Munitions Response Area-Live Impact Area: Munitions Response Sites 9 through 12, 14, and 21 through 28, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico (CH2M HILL, 2006). This document is hereafter referred to as the TCRA/IM Work Plan Amendment.*
- *Final Work Plan for Munitions and Explosives of Concern Subsurface Removal Action, Beaches and Select Roadways, Former Vieques Naval Training Range and Former NASD Solid Waste Management Unit 4, Vieques, Puerto Rico (CH2M HILL, 2008). This document is hereafter referred to as the NTCRA Work Plan.*
- *Final Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico (CH2M HILL, 2010a).*

- *Final Remedial Investigation Sampling and Analysis Plan, Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico (CH2M HILL, 2011a).*

1.2.1 Former Vieques Naval Training Range

Vieques is located in the Caribbean Sea approximately 7 miles southeast of the eastern tip of the island of Puerto Rico and 20 miles southwest of St. Thomas, U.S. Virgin Islands. It is approximately 20 miles long and 4.5 miles wide, and has an area of approximately 33,088 acres (51 square miles). **Figure 1-1** presents the location of Vieques with respect to the island of Puerto Rico.

The Navy purchased large portions of Vieques in the early 1940s to conduct activities related to military training. The eastern end of Vieques (VNTR) was used for various aspects of naval gunfire training, including air-to-ground ordnance delivery and amphibious landings, as well as housing the main base of operations for these activities, Camp Garcia. Site operations on the western end of Vieques, within the former Naval Ammunition Support Detachment (NASD), consisted mainly of ammunition loading and storage, vehicle and facility maintenance, and some training. The Navy ceased operations on the former NASD and VNTR prior to transferring the land to the Department of Interior (DOI), Municipality of Vieques (MOV), and the Puerto Rico Conservation Trust, as required by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), which was amended by Section 1049 of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107). The NASD was transferred in May 2001 and the VNTR was transferred in May 2003.

On February 11, 2005, Vieques was placed on the National Priority List (NPL) as part of the former Atlantic Fleet Weapons Training Area - Vieques, which required all subsequent environmental restoration activities for Navy Installation Restoration (IR) sites on Vieques be conducted under CERCLA unless and until removed from CERCLA authority. The Navy, DOI, USEPA, and EQB executed a Federal Facility Agreement (FFA) on September 7, 2007 that established the procedural framework and schedule for implementing the CERCLA response actions for Vieques. Although the DOI is directed to protect and conserve the land transferred to it as part of the National Wildlife Refuge System, the Navy retains the responsibility for conducting environmental clean-up of the property, as warranted.

The former VNTR is approximately 14,600 acres in size, located on the eastern one-third of the island, and is divided operationally into four Munitions Response Areas (MRAs) that from west to east comprise: the 11,000-acre Eastern Maneuver Area (EMA); the 2,500-acre Surface Impact Area (SIA); the 900-acre Live Impact Area (LIA); and the 133-acre ECA (**Figure 1-2**).

1.2.2 UXO 1

UXO 1 is 133 acres in size, was established as a conservation area in 1983, and is managed as part of the Vieques National Wildlife Refuge with no planned public access or groundwater use. UXO 1 was not known to have been used as target area for munitions; however, the site is located adjacent to the LIA (UXOs 2, 3, and 4), where naval gunfire and air-to-ground (ATG) training activities occurred from the 1970s through 2003. In addition, the open burn/open detonation (OB/OD) area within the LIA generated an explosive safety arc that extended well into the ECA. Therefore, MEC and other munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA.

1.2.3 Investigation History

Previous environmental investigations/activities conducted at the ECA are summarized in **Table 1-1**. Investigations/activities conducted prior to the RI included records reviews and interviews, site inspections and investigations, and interim actions. Each of these investigations/activities is summarized below.

Environmental Baseline Survey

As a condition of the property transfer of the former VNTR, an environmental baseline survey (EBS) was conducted in 2000 to disclose factual, relevant information regarding the environmental condition of the property prior to transfer (Program Management Company, 2000). The EBS was based on records reviews, site inspections and investigations, including environmental sampling, witness interviews and other existing environmental information related to

operations and the storage, release, treatment or disposal of hazardous substances or petroleum products on the property. The area referred to as the Punta Este Conservation Zone in the EBS comprises what is now called the ECA.

Preliminary Range Assessment

The Preliminary Range Assessment (PRA) (CH2M HILL, 2003) was conducted in November 2002 and was designed to identify MEC areas that may pose a threat to the public or the environment; to identify those MEC areas that warrant further investigation prior to arriving at decisions on the need (or lack of need) for remedial actions; and to identify the need for an accelerated remedial action or removal action because of an imminent threat to human health or the environment.

Time-Critical Removal Action

A Time-Critical Removal Action (TCRA) (CH2M HILL, 2010) was conducted in UXO 1 from January through December 2008, and included the removal of surface MEC from 125 acres of UXO 1. MEC identified generally decreased in number from west to east, away from the LIA. The TCRA was not performed on steep slope areas (i.e., cliffs), which comprises a small percentage of the total UXO 1 area. Information from the TCRA was used, in part, to determine the nature and extent of MEC and other munitions-related material at UXO 1.

Expanded Range Assessment/Site Inspection

The Expanded Range Assessment/Site Inspection (ERA/SI) (CH2M HILL, 2010b) was conducted from January 2005 to December 2008 for the 17 UXO sites at the former VNTR, including UXO 1, and included ground- and aerial-based evaluations of specific areas to determine the presence and estimate the quantity of munitions:

- A handheld magnetometer survey was conducted for the sandy beach areas of UXO 1 (Playa Blanca/Beach 15, Beach 16) as part of the ERA/SI. The results identified a number of subsurface anomalies at the beach areas of UXO 1; however, the anomalies were not investigated to determine what was producing the magnetometer response.
- The light detection and radar (LiDAR) survey identified craters within UXO 1 along the eastern boundary adjacent to UXO 4 (LIA), which is consistent with historical activities conducted in UXO 4. The orthophotography developed by the LiDAR survey identified craters in the lagoon along the western end of the site that are potentially related to historical military activities at the adjacent site.
- Elevated Anomaly Density Areas (EADAs) were identified in UXO 1 during an aerial magnetometer survey (AMS) conducted in December 2008. The results of the AMS identified EADA 19 with a moderate anomaly density (5 to 10 anomalies per acre) on the eastern half of UXO 1, with an increase to a high density of detections (greater than 10 anomalies per acre) approaching the border with UXO 4. Because the TCRA for UXO 1 was completed in December 2008 and surface MEC removal activities were completed before the AMS survey took place, the anomalous areas are likely associated with the subsurface.

The results of the ERA/SI for UXO 1 indicate that overshot or kick-out from munitions activities at the former LIA extended into the ECA, where over 1,300 MEC were identified (**Figure 1-3**). Information from the ERA/SI was used, in part, to determine the nature and extent of MEC and other munitions-related material at UXO 1.

Non-Time-Critical Removal Action

The removal of subsurface MEC at UXO 1 beaches and roads occurred as part of a non-TCRA (NTCRA) (CH2M HILL, 2009). NTCRA work at UXO 1 occurred between April 2010 and February 2011. Information from the NTCRA was used, in part, to determine the nature and extent of MEC and other munitions-related material at UXO 1.

1.3 Report Organization

The RI Report is organized as follows:

- Section 1 – Introduction
- Section 2 – Summary of Field Investigations
- Section 3 – Physical Characteristics
- Section 4 – Nature and Extent of Contamination

- Section 5 – Chemical Fate and Transport
- Section 6 – MEC Explosive Risk Evaluation
- Section 7 – Human Health Risk Assessment Summary
- Section 8 – Ecological Risk Assessment Summary
- Section 9 – Summary, Conclusions, and Recommendations
- Section 10 - References

Tables and figures are provided at the end of each respective section. Appendices are provided electronically in PDF format on CD-ROM.

Appendices are:

Appendix A	Surface Water and Sediment Sampling Data Sheets
Appendix B	Incremental Soil and Soil Boring Logs
Appendix C	General Chemistry Data
Appendix D	Survey Data
Appendix E	Data Validation Reports
Appendix F	Investigation Derived Waste Disposal Information
Appendix G	Data Quality Evaluation
Appendix H	SSL Calculation Details
Appendix I	Biological Assessment
Appendix J	Analytical Data Summary
Appendix K	Human Health Risk Assessment
Appendix L	Ecological Risk Assessment
Appendix M	Incremental Background Value Technical Memorandum
Appendix N	Final USEPA and PREQB Response to Comments

TABLE 1-1
Summary of Previous Investigations and Environmental History
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Study/Activity	Author	Purpose of Study/Activity	Field Work Date(s)	Report Date
Environmental Baseline Survey (EBS)	Program Management Company	To disclose available, factual, relevant information regarding the environmental condition of the property. The information is used as a basis for determining the environmental suitability of the property for transfer.	March through May 2000	October 2000
Preliminary Range Assessment (PRA)	CH2M HILL	To provide information about the types, quantities, constituents, and other factors related to the military munitions employed; and identify the type(s) and location(s) of any targets that may have been used at the munitions and explosives of concern (MEC) areas at the VNTR. The information is used to eliminate from further consideration suspect MEC areas that pose no threat to public health or environment and propose an initial explosives safety risk assessment to identify areas for further action.	November 2002	April 2003
Expanded Range Assessment/Site Inspection (ERA/SI)	CH2M HILL	To determine the presence and estimate the quantity of munitions at 17 unexploded ordnance (UXO) sites at the former VNTR.	January 2005 through December 2008	September 2010
Interim Time-Critical Removal Action (TCRA)	CH2M HILL	To reduce the explosive safety risks to the public, at the munitions response (MR) sites identified, by removing all MEC present or exposed on the ground surface.	June 2005 through February 2009	October 2010
Non-Time Critical Removal Action (NTCRA)	CH2M HILL	To reduce the explosive safety risks to the public, at the munitions response (MR) sites identified, by removing subsurface MEC at ECA beaches and roads.	February through April 2011	NTCRA work is ongoing; Report has not yet been produced
ECA Background Investigation	CH2M HILL	This investigation was conducted as part of the overall ECA Remedial Investigation to determine background inorganic soil concentrations in lithologic areas similar to the ECA.	February 2011	October 2011

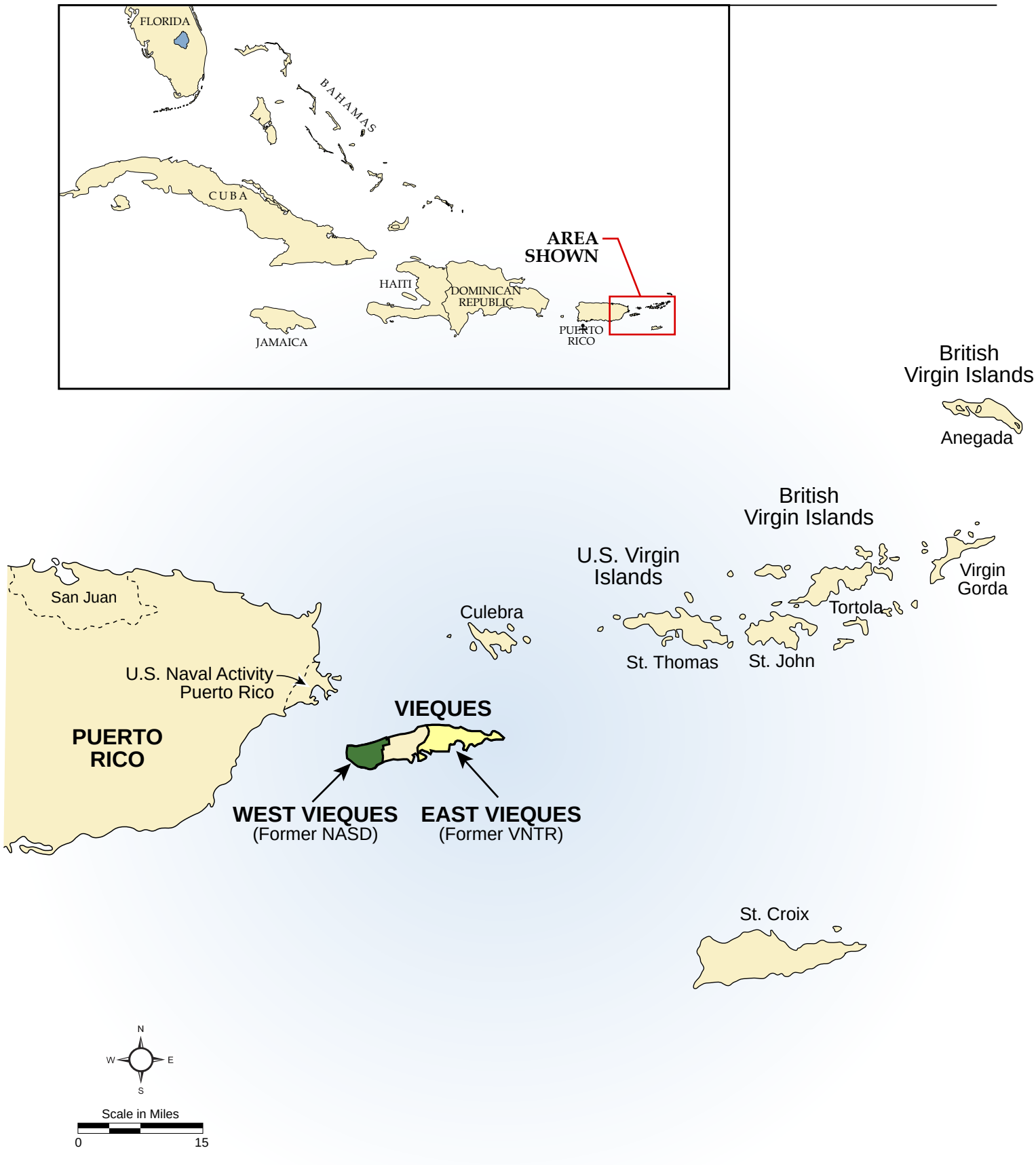


FIGURE 1-1
Regional Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

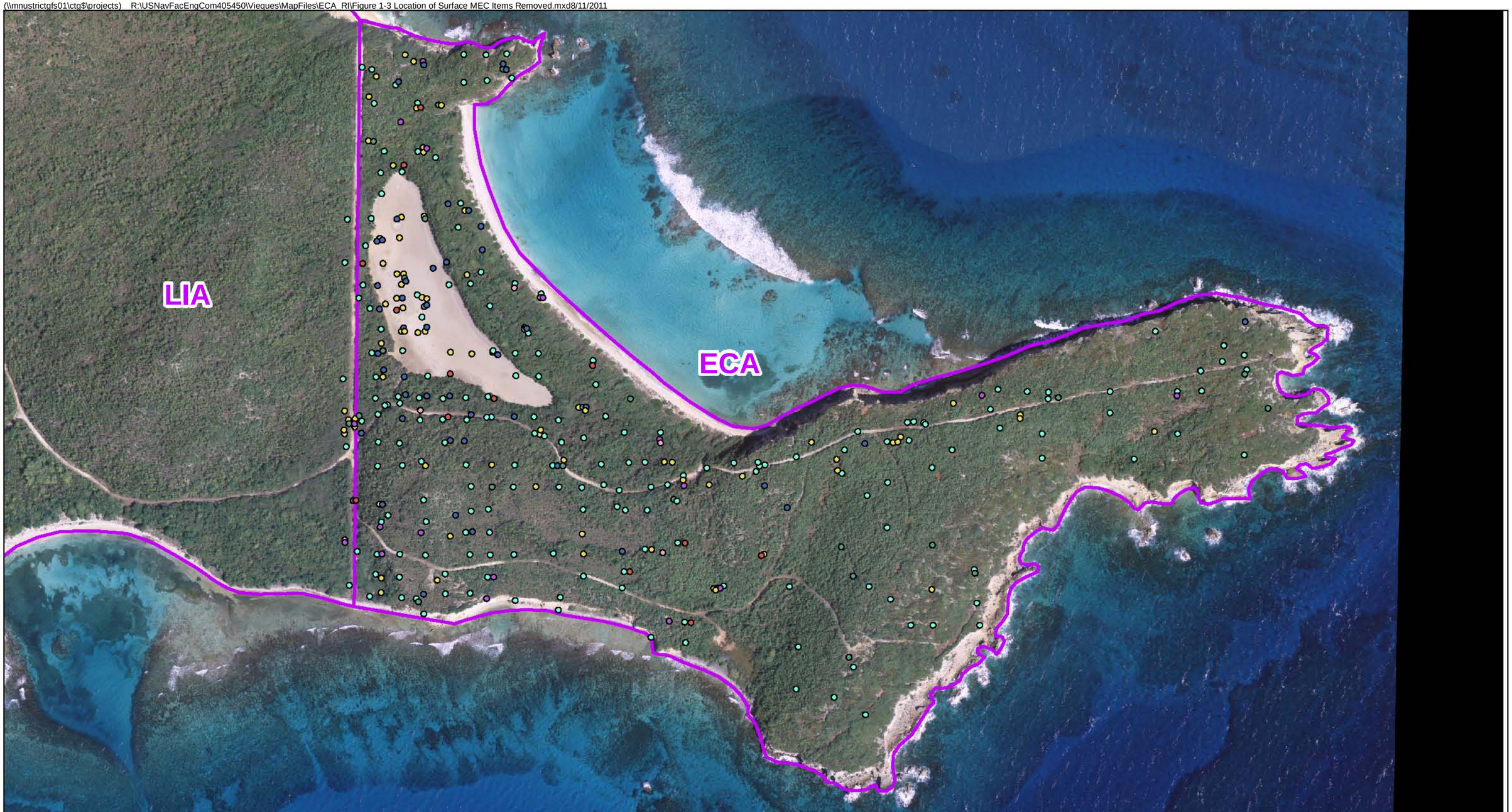
N
W E
S

0 2,000 4,000 8,000
Feet

FIGURE 1-2
ECA Site Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

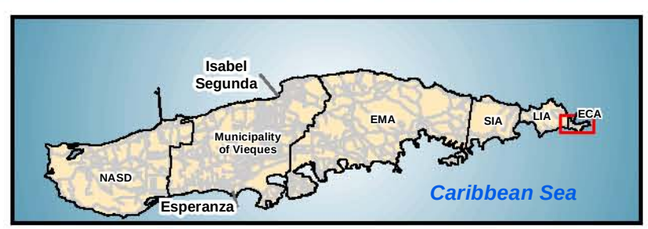
CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 1-3 Location of Surface MEC Items Removed.mxd8/11/2011



Legend

- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- Submunitions
- Munitions Scrap
- Vieques Boundary Section



N
W E
S

0 200 400 800 Feet

2007 Aerial Image

Figure 1-3
Location of Surface MEC Removed
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL®

SECTION 2

Summary of Field Activities

This section describes the approach and methodology of the field investigation activities conducted as part of the investigations that compose the RI at UXO 1. The TCRA and NTCRA focused on surface and subsurface munitions identification and removal. The environmental investigation activities focused on soil, surface water, and sediment.

2.1 MEC Activities

The surface and subsurface munitions interim removal activities for UXO 1 were completed under two separate actions: a TCRA and NTCRA. UXO 1 was subject to surface removal as part of the TCRA in accordance with the TCRA/IM Work Plan (CH2M HILL, 2005) and TCRA/IM Work Plan Amendment (CH2M HILL, 2006). Roads and sandy beaches of UXO 1 were subject to removal of subsurface munitions as part of a NTCRA in accordance with the NTCRA Work Plan (CH2M HILL, 2008). The areas addressed under the TCRA and NTCRA at UXO 1 are presented on **Figure 2-1**.

To assist the reader, the definitions of munitions-related material and constituents referred to in this RI Report are provided here. Material identified within the former VNTR is generally classified as Munitions and Explosives of Concern (MEC), Munitions Debris (MD) or Range-Related Debris (RRD). MEC is further subcategorized into Unexploded Ordnance (UXO), Discarded Military Munitions (DMM), and Munitions Constituents (MC). A brief definition of each is provided below:

- MEC – distinguishes specific categories of military munitions that may pose unique explosive safety risks
- UXO - munitions that have been: primed, fused, and armed, or otherwise prepared for action; have been placed in such a manner as to constitute a safety hazard; and remain unexploded
- DMM – munitions that have been abandoned or removed from storage without proper disposal
- MC – any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such munitions. MC is only considered MEC when they constituents are present in high enough concentrations to pose an explosive hazard.
- MD – Remnants of munitions remaining after munitions use, demilitarization, or disposal
- RRD – Debris, other than munitions debris, collected from ranges (such as targets).

The MEC activities involved investigation and removal of physical munitions-related material and did not evaluate site media for MC; the presence/absence of MC in the site media was conducted as part of the RI sampling activities. In addition, where various categories are collectively discussed, they are often referred as munitions-related material. Non-munitions-related material (e.g., municipal-type trash) is also referred to as cultural debris to distinguish them from RRD.

2.1.1 Development of Investigation Nomenclature

Prior to mobilizing to conduct the TCRA and NTCRA, nomenclature was developed that assisted field teams in data collection and management, site orientation while working in heavily vegetated areas, and to help maintain and control safe separation distances between the various disciplines working on-site at any one time.

2.1.2 Location and Survey Mapping

This definable feature of work included all activities relating to surveying temporary or permanent control points and monuments. Wooden lathe were set on 100 ft corners throughout UXO 1 to serve as site controls for each grid during the interim removal actions. Using the emplaced control points, the MEC removal contractor established individual quadrant corner points for data collection. Location and positional data were generated from an Ashtech Z-FX Surveyor Real Time Kinematic (RTK) Global Positioning System (GPS). A GPS base station (also utilizing an Ashtech Z-FX receiver) was set up near a survey point at Observation Post 1 (OP-1), the established control point for the site.

Real time corrections were broadcast to the roving GPS unit via a radio link where necessary. This system provided positional updates at a rate of 1 Hertz (Hz), with an accuracy of 3 centimeters (cm) horizontal, 5 cm vertical, when no less than 5 satellites were available.

In areas that exhibited inadequate GPS coverage, accurate data positioning was maintained through the use of straight-line profiling for the placement of fiducial marks within the data sets. This method served as a backup to GPS and was used when GPS technology was adversely affected by local vegetation or topographic conditions.

The corner points of all of the quadrants at UXO 1 were surveyed and mapped using these methods. Corner point surveying and mapping efforts were completed by MEC personnel who evaluated each area for the presence of MEC prior to installing the grid stakes.

2.1.3 Vegetation and Brush Removal

To facilitate the investigation and removal of MEC in UXO 1, vegetation clearance was conducted, as necessary, to allow access to the area and to facilitate searching for MEC in a safe and efficient matter. The vegetation was cut manually using hand tools that were appropriate for the vegetation being cut, such as chain saws and heavy-duty power weed trimmers. The vegetation removal team was supported in its work by UXO technicians to provide anomaly avoidance during the operations. Anomaly avoidance is defined using Department of Defense Ammunition and Explosives Safety Standards (DoDM 6055.09-M).

Prior to manual vegetation removal of designated areas, UXO technicians conducted a magnetometer-assisted visual surface sweep of the area to be cleared of vegetation in order to identify MEC on the ground surface and reduce the safety hazards for the vegetation clearance team. MEC identified during the magnetometer assisted visual surface sweep were marked. If possible, MEC was removed before vegetation removal began. The vegetation removal teams were briefed on the work area prior to commencing or continuing brush clearance.

If the UXO technicians saw anything in their path that warranted re-inspection during the magnetometer-assisted visual surface sweeping, vegetation removal was halted while UXO technicians inspected the material identified.

If vegetation was so dense that it prevented a thorough surface sweep, a systematic “step-down” method of brush clearance was instituted to allow for a complete surface clearance/survey. All cutting occurred at least 6 inches above ground level. This prevented disturbing subsurface MEC that may have been entangled in plant roots, as well as prevented soil erosion.

Care was taken to ensure cut trees and branches landed in areas where MEC surface sweep had been performed. Cut trees and branches were not dragged through areas where surface MEC sweep had not been conducted.

Vegetation clearance personnel consisted of UXO technicians and deforesters.

2.1.4 Surface MEC Removal

The surface MEC removal from UXO 1 was conducted from January through December 2008. The work area was divided into individual 100-by-100-foot grids**.** Each grid was further subdivided by the MEC contractor into individual search lanes consisting of 5-foot-wide paths parallel to one grid boundary. Search lanes were adjacent to each other and covered the entire grid. The search lanes were established in accordance with procedures detailed in the TCRA/IM Work Plan Amendment (CH2M HILL, 2006) and contractor-specific work plans.

After search lanes were established, the UXO technician teams searched each lane using a Schonstedt® GA-52Cx to locate metallic items that may have been camouflaged by soil or hidden in vegetation. Each team performed a surface removal of metal debris, MD, and RRD from the work areas. UXO personnel began at one end of each lane and moved forward toward the opposite side while moving the magnetometer from one side of the lane to the other. The MEC team traversed each grid to detect, locate, and remove all MEC encountered and recover MD, RRD, and cultural debris that was free of explosives.

When a metallic item was detected on the surface, the UXO technician would halt and install the appropriate colored flag to indicate its classification. MEC encountered during the surface sweep were reported to the Senior UXO Supervisor (SUXOS) and left in place for disposal. The SUXOS coordinated with demolition personnel for the disposal of material requiring demolition. If the metallic items found were determined to be MD or non-MEC related debris,

the material was recovered by the UXO team. The MD and non-MEC related debris were segregated accordingly and stockpiled with other scrap.

2.1.5 Geophysical Survey

The geophysical survey at UXO 1 was conducted from April to July 2010 and involved a number of tasks, detailed below, that were designed to identify subsurface anomalies at UXO 1. These tasks included the use of an established geophysical prove-out area, geophysical data collection and processing, selection of target anomalies, reacquisition of selected targets, and associated data management and reporting.

Geophysical Prove-Out

The initial phase of the geophysical investigation was an evaluation of the proposed geophysical instrumentation. An established “prove-out” area, consistent with the local site conditions, was “seeded” with known site material for use by NAEVA Geophysics Inc. of Baltimore, Maryland, the geophysical subcontractor, in evaluating the repeatability of their instrumentation and as Quality Control (QC) checks. The two-person geophysical team employed an inductively coupled metal detector (EM-61-MK2) followed by a cesium-vapor total field magnetometer (Scintrex Smartmag SM-4), in conjunction with a base station magnetometer, across the entire prove-out area using the same survey techniques to be exercised for the investigation. Upon evaluation of the data, including the terrain and target material responsiveness, the best suited instrument was selected for the investigation.

Results from the geophysical prove-out area indicated that the EM-61-MK2 instrument was best suited for the objective of this study and as such was chosen as the instrument of choice for this assignment.

Geophysical Data Collection

The Geonics EM61-MK2, a high-resolution time-domain electromagnetic detector, was utilized for the DGM survey. The standard EM61-MK2 system consists of two air-cored, 1 m by 0.5 m (3.3- by 1.2-foot) coils, a digital data recorder, batteries and processing electronics. The EM61-MK2’s transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. Each of the two spatially separated receiver coils is capable of measuring these induced eddy currents. The EM61-MK2 offers the ability to measure the eddy currents at three distinct time intervals in the bottom coil or four intervals if no top coil measurements are recorded. Secondary voltages induced in both coils are measured in millivolts (mV). The arrangement of coils is such that there is a vertical separation of 40 cm (15.7 inches). To obtain as much information about the decay of the induced EM signal as possible, the top coil was not used for this DGM survey; rather data were recorded at four bottom coil time gates. The EM61-MK2 system was operated in the litter mode, with the coils mounted on two long poles and carried by a team of two with shoulder harnesses. The electronics, battery, and an integrated data logger were carried in a small operator backpack.

Spatial positioning of the EM-61-MK2 was achieved using GPS and fiducial marks. GPS is the primary navigation choice, and is used when the EM-61-MK2 is deployed in the trailer mode or array mode. Once-per-second GPS coordinates are logged that capture the location of the GPS antenna co-located at the center of the EM-61-MK2 coil. Navigation via fiducial time marks can be utilized when the EM-61-MK2 is deployed in a harness mode while the EM-61-MK2 data are recorded at fixed time intervals.

Geophysical data collection efforts at UXO 1 were conducted using the litter mode since this method allowed the field team optimum mobility while negotiating the difficult site terrain. Data were collected by walking each quadrant at 3-foot spacing using color-coded ropes as guides to keep field teams on-line while traversing each quadrant. This method yielded 100 percent digital geophysical mapping of each 100-ft by 100-ft quadrant. Geophysical data collection efforts were completed in a total of 64 quadrants (approximately 16 acres comprising roads and sandy beaches)

DGM data were collected from the areas shown on **Figure 2-1** to the maximum extent practicable. In some areas, identified as “obscured areas” on **Figure 2-1**, site features such as remaining vegetation and large rocks prevented the DGM collection team from being able to collect accurate DGM data. These areas were identified as polygons that required investigation using the “mag and dig” approach, whereby the intrusive team would use a hand-held magnetometer to identify the locations of anomalies.

Geophysical Data Processing and Target Selection

Raw data collected in the field were first gridded and displayed on the field computer screen as a color contour image with the track plot overlaid on the map. The purpose of this initial exercise was to assess the positioning and density of the data mapped within individual quadrants.

Geophysical data processing at UXO 1 included the following procedures:

- Conversion of local grid coordinates to Puerto Rico State Plane coordinates
- Diurnal drift correction (magnetics)
- Heading corrections
- Lag corrections
- Normalization or leveling (removal of background)
- Gridding of data
- Digital filtering and enhancement
- Calculating the 3D analytic signal from the magnetic data
- Gridding of analytic signal
- Selection of anomaly picks (above the 2.5 mV threshold, *as specified in the NTCRA work plan [CH2M HILL, 2008*])
- Preparation of geophysical maps and target maps

Geophysical anomalies (also referred to as targets) were identified from the processed data. For each quadrant, the geophysical subcontractor evaluated each of the following factors prior to identifying anomalies for investigation:

- The local background (terrain noise) conditions
- Evaluation of data completeness and accuracy
- Assessment of data quality based on the survey and grid QC data
- The grid boundary conditions, utilities and/or other cultural features present and un-surveyable areas (trees and other obstructions)

The geophysical contractor analyzed the geophysical data for each MEC investigation quadrant, identified anomalies that may represent buried MEC, and prepared anomaly lists containing the following information:

- Project site
- Geophysical contractor
- Responsible geophysicist
- Quadrant identification
- Quadrant corner locations and coordinates
- Unique anomaly identification numbers
- Anomaly easting and northing in State Plane coordinates
- Instrument peak value at each anomaly location

Dig-sheets prepared from processed data were created using the following criteria for selecting and locating targets from the anomaly list:

- The maximum amplitude of the response with respect to local background conditions
- The location of the response
- The amplitude of the response

The geophysical contractor also provided a quadrant map with each dig sheet that contained the following:

- Quadrant identification
- Quadrant corner locations and coordinates
- Contoured data
- Anomaly locations with unique identification numbers

Anomaly Reacquisition and Intrusive Investigation

Before intrusive activities were performed, all targets identified from the DGM surveys with a magnetic signature greater that 2.5 millivolts (mV) were reacquired. Anomaly reacquisition consisted of locating the ground position of the anomaly coordinates using RTK GPS to navigate to the coordinates obtained for the anomaly through the DGM survey. Once the anomaly's location was identified, a non-metallic pin flag, labeled with the unique anomaly number, was placed in the ground at the indicated coordinates. Then, the same instrument used to detect the target (electromagnetic sensor) was used to identify the peak location of the anomaly. This location served as the center of the anomaly investigation area, which was a circle with a 1 meter radius around the anomaly.

The intrusive anomaly investigation was conducted from May 2010 through February 2011. After the anomaly's location was reacquired, the UXO teams excavated anomalies using mechanical and hand digging methods. Teams would periodically check the location of anomalies with a handheld magnetometer to determine if additional excavation was necessary or if the anomaly had been removed along with the soil. Once excavation was estimated to be within 1 ft of the anomaly, teams would perform all digging by hand. The total depth of the investigation depended on the location of the work and, ultimately, the site conditions. Anomalies along the road were excavated to a maximum depth of 2 feet bgs and anomalies at the beaches were excavated to a maximum depth of 4 ft bgs. The investigation of the anomaly was considered complete once the anomaly was found and removed and the electromagnetic reading for the entire 1 meter radius around the anomaly location was below 2.5 mV, or the area was dug to the maximum depth without finding the anomaly, or the team encountered site conditions, such as bedrock or water, that prevented deeper excavation. If an anomaly was not found or the area continued to have a high reading following the investigation to the maximum depth, the anomaly identification, coordinates, and the reason for the remaining electromagnetic reading above 2.5 mV were recorded. A summary of the "no finds" during the intrusive anomaly investigation from May 2010 through February 2011 is included in **Table 2-1** and presented in **Figure 2-2**.

MD and RRD Segregation, Accumulation, and Storage

The MD and RRD were stockpiled at consolidation areas for inspection by the material processing contractor to ensure that no MEC or material with explosive hazards were present. MD and RRD inspections consisted of visual inspections of all surfaces (internal and external) to detect the presence of explosive or reactive materials. If the internal surfaces could not be visually inspected, the material was returned to the MEC removal contractor for venting or demolition, so that the visual inspection could be accomplished. The MD and RRD that passed inspection were transported to the CPC for processing.

The materials recovered from UXO 1 were stockpiled in the CPC, along with MD and RRD collected from across the entire former VNTR, according to material type (e.g., steel and aluminum). Material was processed, as necessary, to demilitarize it and the MD was further processed through a flash furnace to remove potential explosive residues. One a sufficient volume/tonnage of processed material was accumulated in the stockpiles, the material was sent off-island for recycling.

MEC Consolidated Demolition and Demilitarization

The MEC contactor removed and detonated, as necessary, all MEC encountered during both the TCRA and NTCRA. The MEC contractor maintained detailed accounting of all MEC encountered in log books and data were also recorded in personal digital assistants (PDAs) and imported and stored in the NAVFAC MRP database.

If at any time MEC was deemed acceptable to move, the MEC contractor consolidated material at a pre-determined location at the site. In the event the material was determined unacceptable for moving, it was marked and detonated using blow-in-place (BIP) methods; in these cases, other MEC that were safe to move were transported to the location of the BIP and consolidated for detonation. The locations of the MEC demolition events are shown on **Figure 2-3**.

Once the MEC was destroyed or removed, the area was checked to ensure the MEC had not been masking other material. After successful initiation of the explosive charge, the UXO team inspected the disposal site and surrounding areas to ensure complete destruction of the MEC. After verifying that no more detonations were required to destroy the MEC, an "all clear" notification was issued and regular site activities were allowed to resume.

2.1.6 Data Management

Logbook and daily report information was combined to create weekly reports that summarized activities completed. Field data, collected electronically, and geophysical data were downloaded in the field and sent electronically to CH2M HILL's data manager. This information was converted for use in the Vieques MR database and GIS system for use in project planning and reporting. Site safety information, which included daily safety briefs, safety incidences, and employee health and safety documentation, was kept on site and summarized in the weekly reports, as necessary.

2.1.7 Quality Control

The QCP for the MEC surface TCRA and the subsurface NTCRA are documented in Section 9 of the TCRA/IM Work Plan (CH2M HILL, 2005) and Section 10 of the NTCRA Work Plan (CH2M HILL, 2008), respectively. QC testing on the three phases of work for the various disciplines working on-site was performed according to pre-determined schedules as outlined in Section 9.7 and **Figure 9-1** of the TCRA/IM Work Plan (CH2M HILL, 2005).

Copies of the TCRA/IM Work Plan (CH2M HILL, 2005) and the NTCRA Work Plan (CH2M HILL, 2008) were on site at all times for referencing QC guidelines, methodologies, and implementation procedures as defined in the above plans, including:

- Identifying the project QC organization and defining each individual's respective authority, responsibilities, and qualifications
- Defining the project communication, documentation, and record keeping procedures
- Establishing the QC procedures, including the necessary supervision and tests, to ensure that the work met applicable specifications and drawings

The QCP for both the TCRA and NTCRA covered a number of work-related disciplines executing a series of definable features of work under a three-phase inspection process with QC that included:

- A preparatory phase
- Initial phase
- Follow-up phase

The UXO Quality Control Specialist (UXOQCS) performed a preparatory phase inspection prior to beginning each new definable feature of work. The purpose of this inspection was to review applicable specifications and verify that the necessary resources, conditions, and controls were in place and compliant before the start of work activities. To conduct and document this inspection, the UXOQCS or designee used a preparatory inspection checklist.

The UXOQCS reviewed work plans and operating procedures to ensure that they described pre-qualifying requirements or conditions, equipment and materials, appropriate sequence, methodology, hold/witness points, and QC provisions including:

- The required plans and procedures had been prepared and approved and were available to the field staff
- Field equipment was appropriate for its intended use, available, functional, and properly calibrated
- Staff responsibilities had been assigned and communicated
- Staff had the necessary knowledge, expertise, and information to perform their jobs
- Arrangements for support services (such as laborers and specialized equipment) had been made
- Prerequisite site work had been completed

The UXOQCS completed an initial phase inspection form the first time a definable feature of work was performed. The purposes of this inspection were to check preliminary work for compliance with procedures and specifications, establish the acceptable level of workmanship, and check for omissions and resolve any differences of interpretation.

Follow-up phase inspections were performed after a work process had begun during the initial phase and periodically throughout the work process. The purpose of the inspection was to ensure the process was being completed in accordance with agreed upon standards, identify changes in the process, and ensure that the level of quality met expectations. The UXOQCS was responsible for monitoring work processes taking place and verifying continued

compliance with contract specifications and requirements. Follow-up phase activities were documented on a surveillance report and daily QC reports. Deficiencies identified during follow-up phase inspections were documented and corrective action taken.

QC Testing

QC testing was performed to ensure that the TCRA and NTCRA were being performed according to the performance standards for this project.

- Surface MEC removal QC testing was performed at the completion of each lot of surface grids/quadrants (each lot was composed of 4 grids). The QC testing was conducted at each grid following the same procedures employed during the surface removal activities. No QC deficiencies were identified during removal of MEC from the ground surface at UXO 1.
- Subsurface MEC removal QC testing was performed at the completion of each lot of anomalies according to the established procedures and prior to Quality Assurance (QA) testing. The QC testing was conducted at each anomaly location using the same geophysical equipment used to initially identify and reacquire the anomalies. The anomaly location passed the QC process if the millivolt reading was below 2.5 mV or if the UXOQCS verified/witnessed the anomaly was dug to depth or water was encountered. No QC deficiencies were identified during the subsurface UXO 1 MEC removal activities.

Quality Assurance Activities

Following MEC removal activities and subsequent QC, the CH2M HILL UXOQCS performed a QA inspection following the guidelines in MILSTD 1916.

2.2 Environmental Investigation Activities

Following the TCRA, the environmental media RI was conducted at UXO 1 from January to February 2011. Environmental investigation activities included the collection of surface and subsurface soil, sediment, and surface water samples, with anomaly avoidance support. Due to the large size of UXO 1 and random distribution of MEC, an incremental surface soil sampling approach was implemented to improve the reliability of sampling data by reducing the variability inherent to discrete sampling strategies, while ensuring emphasis on areas with the highest potential for contamination and areas that best or most-conservatively represented the site as a whole. Specific details of the sampling objectives are presented in the RI Sampling and Analysis Plan (SAP) (CH2M HILL, 2011a). Field activities were conducted in general accordance with the Standard Operating Procedures (SOPs) presented in the RI SAP and the Final Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico (MSOPPP) (CH2M HILL, 2010a).

Table 2-2 summarizes the environmental data collected including the media sampled, analyses performed, sample identifications, and depth of sampling for the data included in this RI Report. **Figure 2-4** presents the sample locations at UXO 1. In addition to the site samples, background incremental soil samples were collected from the same lithology within the south-central portion of Vieques, as shown in **Figure 2-5.**

All samples collected during the RI sampling were submitted for analysis to Test America Laboratories, Inc. of West Sacramento, California.

2.2.1 Sampling Approach and Methods

Surface soil sampling was conducted using the incremental sampling strategy and approach, in general accordance with the guidance document *Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program* (USACE, 2009) and in accordance with the RI SAP (CH2M HILL, 2011a). Discrete deeper surface soil, sediment, and surface water samples were collected in accordance with Vieques SOPs (CH2M HILL, 2010). Surface water and sediment logs are included in **Appendix A** and incremental and discrete soil boring logs are included in **Appendix B.** Grain size analyses and wet chemistry data are provided in **Appendix C.**

Decision units were established at UXO 1 to be a specific area about which a decision was to be made (**Figure 2-4** and **Figure 2-6, Photos A-E**). Since the human health and ecological exposure pathways and exposure areas at UXO 1 vary across the site, each decision unit was selected to be representative of the different receptors, receptor exposure

areas and durations, and type and number of MEC encountered at the site. Based on this, UXO 1 was separated into five decision units with the following receptor exposure scenarios (**Figure 2-4**):

- Beach – approximately 10 acres in size, extending from the water line to 60 feet into the vegetation; human health (beach and site-wide scenarios) and ecological terrestrial receptors exposed to surface and deeper surface soil (to account for turtle nesting) (**Figure 2-6, Photo A**)
- Upland – approximately 90 acres in size; human health (upland area and site-wide scenarios) and ecological terrestrial receptors exposed to surface soil (**Figure 2-6, Photo C**)
- Lowland – approximately 20 acres in size; human health (lowland area and site-wide scenarios) and ecological terrestrial receptors exposed to surface soil (**Figure 2-6, Photo E**)
- Lagoon Fringe – approximately 2 acres in size, extending from the high water mark of the lagoon to 30 feet inland where USFWS workers may traverse while monitoring migratory water fowl; human health (lagoon and site-wide scenarios) exposed to surface soil and ecological terrestrial receptors exposed to surface and deeper surface soil (to account for land crabs) (**Figure 2-6, Photo D**)
- Lagoon – approximately 9 acres in size; human health (lagoon and site-wide scenarios) and ecological aquatic receptors exposed to surface water and sediment (**Figure 2-6, Photo B**)

Within each decision unit, sampling units were selected to be representative of the concentrations within that exposure area. Sampling units were generally approximately 1 acre in size or less to account for the receptors with smaller exposure areas (except at the beach). Each sampling unit is the same size within its decision unit. Sampling units were designed to target areas with high density munitions material and to account for each type of munitions and munitions-related debris identified during the munitions activities (**Figure 2-4**). **Table 2-3** summarizes the munitions-related material found and removed during the TCRA within all UXO 1 sampling units. Sampling units in areas other than the beach and lagoon fringe decision units were based on compiling multiple quarter-acre grid areas established for MEC surface removal. Where one or more of these quarter-acre grids shares a common boundary with another decision unit, the sampling unit is configured to end at (and not cross over) the boundary.

Within each sampling unit, 100 or more subsamples (increments) were collected using a nominal 0.5-inch diameter coring device, or a stainless steel spoon (to a depth of approximately 2 inches depending on surface conditions) to achieve an adequate total sample mass of 1,000 grams or more (in accordance with the approach in the USACE guidance and SOPs). The subsamples are composited as one incremental soil sample to be homogenized by the analytical laboratory. Therefore, one incremental sample is collected in each sampling unit. Subsamples were collected in a systematic random sampling approach, where the subsamples are collected in a general uniform grid across the sampling unit. Subsamples were collected with a combination of stainless steel spoons and incremental samplers (MIST-1 and/or MIST-2 samplers). Subsamples were collected into plastic gallon-sized bags, and brought to the field vehicle where a corner was removed from the bags to funnel the sample into the labeled sample jars. The jars were then kept on ice, and packed and shipped with sufficient ice to maintain the preservation temperature until they arrived at the analytical laboratory.

Energetic and inorganic chemicals associated with munitions releases on ranges primarily occur as particulates deposited heterogeneously on the soil surface, primarily from propellant residues at firing points, explosive residues near detonations in impact areas, and from controlled detonations. The highest concentrations are present near the ground surface with the vast majority in the top inch or two. Therefore, incremental sampling at ranges focuses on the top 2 inches of soil and represents the most conservative exposure depth interval for human health and terrestrial ecological receptors.

The locations of all incremental and discrete soil, surface water, and sediment samples were surveyed using hand-held GPS by CH2M HILL field personnel. Where vegetative cover made GPS surveying less precise, sample locations were identified using a combination of maps and landmarks to visually place points on a map from which latitude and longitude could be approximated. All survey data for all sampling locations at UXO 1 are located in **Appendix D** of this report.

The explosives constituents analyzed at the ECA were developed during multiple project scoping sessions attended by the Navy, EPA, PREQB, and FWS. The list of analytes was included in the regulatory approved ECA RI SAP (CH2M HILL, 2011a). Note that explosives were infrequently detected in surface soil and were not detected in subsurface soil, surface water, and sediment. Further, there are no widely accepted human health or ecological screening levels for ammonium picrate for the media sampled as part of the RI. The sampling design and rationale for each decision unit and the background data set, and how the data were evaluated, is discussed below.

Beach Decision Unit

Two incremental surface soil samples (1DU01 and 1DU02), plus triplicate samples for 1DU01, from 0 to approximately 2 inches bgs and two discrete deeper surface soil samples (1SB01 and 1SB02), plus duplicate sample for 1SB02, from 18 to 24 inches bgs were collected within the Beach Decision Unit (**Figure 2-7, Table 2-2**).

The incremental surface soil samples were collected with spoons, since sand could not be retained in the incremental sampling tool. The deeper surface soil discrete samples were collected from 18 to 24 inches bgs to best represent the depth of turtle egg nests and as close to possible to where relatively higher frequencies of MEC were identified within the decision unit. Holes were excavated in the sand with a shovel to slightly greater than 24 inches bgs at each discrete sample location, and the sample was collected with a spoon in the wall of each excavation from 18-24 inches bgs. The discrete soil sample was homogenized and placed in sample jars. One sample (1SB01) in the Beach Decision unit was split with EPA for independent analysis.

Upland Decision Unit

Fifteen incremental surface soil samples (4DU01 through 4DU15), plus triplicate samples for 4DU02, 4DU09, and 4DU11, from 0 to approximately 2 inches bgs, one surface soil sample (4SS01), plus duplicate sample, from 0 to 1 ft bgs within the battery disposal area, and one deeper surface soil sample (4SB01) from 0 to 1.5 ft bgs within a land crab burrow area identified in the southwest corner of UXO 1 during the investigation were collected within the Upland Decision Unit (**Figure 2-8, Table 2-2**).

Four of the six detonation events took place within sampling units:

- The detonation event on 3/28/2008 was within sampling unit 4DU11
- The western detonation event on 9/30/2008 was within sampling unit 4DU09
- The eastern detonation event on 9/30/2008 was within sampling unit 4DU12
- The detonation event on 12/9/2008 was within sampling unit 4DU13

Incremental samples were collected with a combination of stainless spoons and incremental samplers. The discrete soil samples were collected using a hand auger. The discrete soil sample was homogenized and placed in sample jars. The battery disposal area sample (4SS01) was split with the USEPA representative on site for independent analysis.

Lowland Decision Unit

Five incremental surface soil samples (2DU01 through 2DU05) from 0 to approximately 2 inches bgs and 13 discrete subsurface soil samples (2SB01, 2SB02, 2SB04 through 2SB12, 2SB14, and 2SB15) (generally two feet above bedrock or the water table), plus two duplicate samples, were collected within the Lowland Decision Unit (**Figure 2-7, Table 2-2**). Two discrete soil samples (2SB03 and 2SB13) that were intended to be subsurface were actually collected within what is typically considered the surface soil interval (0 to 1 ft bgs and 0 to 0.5 ft bgs, respectively) since the bedrock was encountered at a shallow depth.

Incremental samples were collected with a combination of stainless spoons and incremental samplers. The discrete soil samples were collected using a hand auger. The discrete soil sample was homogenized and placed in sample jars. Discrete samples 2SB01, 2SB04, 2SB10, and SB13 were split with the USEPA representative on site for independent analysis.

Lagoon Fringe Decision Unit

Five incremental surface soil samples (3DU01 through 3DU05), plus triplicate sample for 3DU04, from 0 to approximately 2 inches bgs and five discrete deeper surface soil samples (3SB01 through 3SB05), plus duplicate sample for 3SB02, from approximately 2 to 24 inches bgs (to represent land crab exposure depth) were collected

within the Lagoon Fringe Decision Unit (**Figure 2-9, Table 2-2**). The discrete deeper surface soil samples were collected where relatively higher frequencies of MEC were found and removed and where relatively higher frequencies of land crab burrows were observed.

Incremental samples were collected with a combination of stainless spoons and incremental samplers. The discrete soil samples were collected using a hand auger. The discrete soil sample was homogenized and placed in sample jars. Discrete samples 3SB03 and 3SB05 were split with the USEPA representative on site for independent analysis.

Lagoon Decision Unit

Fifteen discrete sediment samples (5SD01 through 5SD15) (0 to 6 inches), plus duplicate samples for 5SD02 and 5SD11, and five surface water samples (5SW01 through 5SW05) (at mid-depth), plus a duplicate sample for 5SW02, were collected within the Lagoon Decision Unit (**Figure 2-9, Table 2-2**). Samples were collected following a minimum two to four week period of inundation to allow aquatic communities to become established. Samples were located for spatial distribution characterization and in areas with the highest frequencies of MEC identified.

The sediment samples were collected with a Lexan tube (1 inch diameter, 2 inches long) to a depth of 6 inches bgs (refusal at two locations at 3 inches bgs). The Lexan tube was pulled out of the sediment containing a plug of sediment by placing one hand over the top of the tube to maintain a vacuum. The sediment was extracted by squeezing the sides of the tube, followed by shaking until the sediment was dislodged. For sediment cores difficult to dislodge, a second Lexan tube was split down the side, rolled to a smaller diameter, then inserted as a pushing tool into the sample tube to help force the sample out and into the stainless steel bowl.

The surface water samples were collected mid-depth in the water column with a peristaltic pump. All five surface water samples (5SW01 through 5SW05) and discrete sediment samples 5SD01, 5SD02, 5SD05, 5SD07, 5SD08, 5SD09, 5SD10, and 5SD13 were split with the USEPA representative on site for independent analysis.

2.2.2 Background Sampling

Ten incremental surface soil samples (6DU01 through 6DU10) (0 to approximately 2 inches), plus a triplicate sample for 6DU02, were collected offsite within similar lithology and near locations where discrete soil samples were collected as part of the East Vieques Background Study (CH2M HILL, 2007a) (**Figure 2-5, Table 2-2**). Each sample was analyzed for inorganic constituents to be used for background comparison with site data collected as part of this RI. The incremental samples were collected using the incremental samplers. Evaluation of the incremental background data and generation of the incremental background UTLs is provided in **Appendix M**.

2.3 Decontamination and Waste Management

In accordance with the RI SAP, all downhole and non-disposable sampling equipment was decontaminated immediately after each use following the SOP E-1 in the MSOPPP. Aqueous investigation-derived waste (IDW) (decontamination water) was contained in a 55-gallon drum and temporarily stored on site for characterization. Aqueous IDW was analyzed for the full TCLP list and reactivity, ignitability, and corrosivity; the analytical results are provided in **Appendix F**. The IDW was disposed of properly as nonhazardous waste at the Waste Management (WM) Peñuelas Valley Landfill, Inc. in Peñuelas, Puerto Rico. Records from the handling, lab analysis and transfer of IDW from Camp Garcia are included in **Appendix F**.

2.4 Environmental Data Management

Information on the evaluation of analytical data collected during the environmental investigation to meet the Project Quality Objectives, as described in the RI SAP (CH2M HILL, 2011a), is discussed below.

2.4.1 Data Tracking and Validation

The management and tracking of data from the time of field collection to receipt of validated electronic analytical results were performed. Field samples and their corresponding analytical tests were recorded on chain-of-custody forms for submission to the laboratory. Chain-of-custody entries were checked to verify that all designated samples were collected and submitted for the appropriate analyses. Upon receipt of the samples by the laboratory, a

comparison to the field information was made to ensure that each sample would be analyzed for the correct parameters and the proper number of QA/QC samples.

Third-party validation was performed on the analytical data reports from the investigation. Validation procedures referenced the appropriate guidance, considering the most recent version of guidance available at the time of validation, and the actual analytical method performed. Validation provides proper perspective on data availability and usability. Validation was performed by DataQual Environmental Services, LLC. The full data validation report is presented in **Appendix E**.

A data quality evaluation was performed on the analytical data in accordance with the Final RI SAP (CH2M HILL, 2011a). Results of the evaluation are summarized in **Appendix G**.

2.4.2 Regulatory Standards and Risk-Based Screening Values

The screening process used to evaluate risks to human and ecological receptors and the consideration of a constituent as a Chemical of Potential Concern (COPC) or Chemical of Concern (COC) are discussed in **Sections 7 and 8**. In addition, to determine the nature of soil, sediment, and surface water contamination within UXO 1, analytes were compared to the following screening values:

- Soil sample results were screened against:
  - USEPA Regional Screening Levels (RSLs) for Industrial Soil (June 2011), adjusted as appropriate (for non-carcinogenic effects)
  - Site-specific Soil Screening Levels (SSLs), Migration to Groundwater – Site-specific Dilution Attenuation Factor of 10 calculated per USEPA guidance (USEPA, 2002a); details of the SSL calculations are included in **Appendix H**.
  - Ecological Screening Levels (ESVs) (surface soil only)
  - East Vieques background soil inorganics upper tolerance limits (CH2M HILL, 2007a) for discrete deeper surface and subsurface soil samples; East Vieques background incremental soil inorganics upper tolerance limits (**Appendix M**) for incremental soil samples**.**
- Sediment and surface water sample results were screened against:
  - USEPA RSLs for Industrial Soil (for sediment) and Tap Water (for surface water) (June 2011), adjusted as appropriate (for non-carcinogenic effects)
  - Ecological Screening Values

2.5 Biological Assessment

A biological assessment of the flora and fauna in the ECA was conducted by Geo-Marine (Geo-Marine, 2007)**.** Biologists walked transects through the site, performing a survey of listed biological species and critical habitats. Detailed results of the biological assessment, including a complete list of species identified, is included in **Appendix I**.

A supplemental qualitative survey of the ECA Lagoon was conducted during the RI field sampling activities in February 2011. Information gathered during the biological assessment and survey is discussed in Section 3.

2.6 Cultural Resource and Archaeological Surveys

Southeastern Archaeological Research, Inc. (Search) of Jonesville, Florida conducted an archaeological survey of UXO 1 in 2007 prior to planned vegetation clearing and munitions removal activities. Two previously unrecorded archaeological sites and one isolated find were identified in UXO 1. Results were presented in a technical memorandum submitted to the Puerto Rico State Archaeologist of the State Historic Preservation Office (SHPO) (Southeastern Archaeological Research, Inc., 2007). A summary of the information is provided in Section 3.

2.7 Deviations from Sampling and Analysis Plan

Four minor deviations from the RI SAP (CH2M HILL 2011a) regarding sample collection occurred during its field implementation. All sample locations discussed below are shown on **Figure 2-10**.

1. A land crab burrow area was identified in the southwest corner of the ECA, so a discrete deeper surface soil sample (4SB01) was added in that area.
2. Several of the Lowland discrete subsurface soil samples (2SB01, 2SB03, 2SB11, 2SB13, and 2SB15) were moved within the boundary of the same sampling unit because of encountering shallow bedrock at the originally planned locations.
3. Two Lagoon Fringe samples (3SB01 and 3SB05) were moved slightly to be in areas of highest land crab burrow densities.
4. Two discrete soil samples (2SB03 and 2SB13) that were intended to be subsurface were actually collected within what is typically considered the surface soil interval (0 to 1 ft bgs and 0 to 0.5 ft bgs, respectively) since the bedrock was encountered at a shallow depth.

Table 2-1

Summary of "No Finds" During ECA Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Grid	Anomaly ID	Initial Amplitude* mV	Reacquire Amplitude mV	Item Group	Item Class
K2F9E9	K2F9E9-V-00001	14.20	0.10	Below Depth	No Find
K2F9E9	K2F9E9-V-00002	5.20	0.10	Below Depth	No Find
K2F9E9	K2F9E9-V-00003	5.00	0.10	Below Depth	No Find
K2F9E9	K2F9E9-V-00004	3.20	0.10	Below Depth	No Find
K2F9E9	K2F9E9-V-00006	2.60	0.10	Below Depth	No Find
K2F9E9	K2F9E9-V-00007	2.60	0.10	Below Depth	No Find
K2F9F0	K2F9F0-00004	2.00	0.30	Below Depth	No Find
K2F9F0	K2F9F0-RB-00024	3.65	0.30	No Find	No Find
K2F9F0	K2F9F0-RB-00029	2.94	0.40	No Find	No Find
K2F9G0	K2F9G0-00001	23.00	0.10	Below Depth	No Find
K2F9G0	K2F9G0-00005	2.80	0.50	Below Depth	No Find
K2F9G0	K2F9G0-00006	1.70	1.00	Below Depth	No Find
K2F9H0	K2F9H0-00001	37.80	0.10	Below Depth	No Find
K2F9H0	K2F9H0-00002	8.00	11.50	Below Depth	No Find
K2F9H0	K2F9H0-00003	2.80	0.10	Below Depth	No Find
K2F9H0	K2F9H0-RB-00002	75.70	0.50	No Find	No Find
K2F9H0	K2F9H0-RB-00013	10.04	0.50	No Find	No Find
K2F9H0	K2F9H0-RB-00022	6.14	0.50	No Find	No Find
K2F9I0	K2F9I0-00003	1.80	0.10	Below Depth	No Find
K2F9I0	K2F9I0-00004	1.70	0.10	Below Depth	No Find
K2F9I0	K2F9I0-00005	1.40	0.10	Below Depth	No Find
K2F9J0	K2F9J0-00002	297.10	0.40	Below Depth	No Find
K2F9J1	K2F9J1WB-00001	3.67	10.50	No Find	No Find
K2F9J1	K2F9J1WB-00003	4.47	11.70	No Find	No Find
K2G0B6	K2G0B6-RM-00018	4.03	0.00	No Find	No Find
K2G0B7	K2G0B7-RM-00016	7.13	0.00	No Find	No Find
K2G0C6	K2G0C6-RM-00006	4.67	0.10	No Find	No Find
K2G0C6	K2G0C6-RM-00011	1.62	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00004	4.61	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00005	4.02	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00008	3.04	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00010	2.53	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00011	2.11	0.10	No Find	No Find
K2G0D5	K2G0D5-RM-00012	1.94	0.20	No Find	No Find
K2G0E4	K2G0E4-RM-00007	15.68	0.20	No Find	No Find
K2G0E4	K2G0E4-RM-00009	11.59	0.20	No Find	No Find
K2G0E4	K2G0E4-RM-00010	4.61	0.20	No Find	No Find

Table 2-1

Summary of "No Finds" During ECA Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Grid	Anomaly ID	Initial Amplitude* mV	Reacquire Amplitude mV	Item Group	Item Class
K2G0G3	K2G0G3-RM-00001	2.14	0.00	No Find	No Find
K2G0H2	K2G0H2-RM-00003	4.21	0.00	No Find	No Find
K2G0H2	K2G0H2-RM-00004	2.57	0.00	No Find	No Find
K2G0I1	K2G0I1-RM-00001	12.51	0.00	No Find	No Find
K2G9A0	K2G9A0-00003	3.60	0.10	Below Water	No Find
K2G9A0	K2G9A0-00007	1.70	0.10	Below Water	No Find
K2G9A2	K2G9A2WB-00002	11.74	14.10	No Find	No Find
K2G9B2	K2G9B2WB-00003	12.14	16.20	No Find	No Find
K2G9B2	K2G9B2WB-00005	9.18	19.10	No Find	No Find
K2G9B2	K2G9B2WB-00007	3.02	21.10	No Find	No Find
K2G9B2	K2G9B2WB-00008	3.75	24.10	No Find	No Find
K2G9B2	K2G9B2WB-00010	5.34	24.10	No Find	No Find
K2G9B2	K2G9B2WB-00011	8.59	24.80	No Find	No Find
K2G9B2	K2G9B2WB-00015	6.13	29.00	No Find	No Find
K2G9C2	K2G9C2WB-00009	9.95	39.20	No Find	No Find
K2G9C2	K2G9C2WB-00010	23.98	76.70	No Find	No Find
K2G9C2	K2G9C2WB-00011	6.55	362.00	No Find	No Find
K2G9C9	K2G9C9-00002	3.90	3.40	Below Water	No Find
K2G9C9	K2G9C9-00003	2.90	0.10	Below Water	No Find
K2G9D8	K2G9D8-00001	2.90	0.10	Below Water	No Find
K2G9D8	K2G9D8-00002	1.60	0.10	Below Water	No Find
K2G9F7	K2G9F7-00001	5.10	0.00	No Find	No Find
K2G9F7	K2G9F7-00002	4.60	5.60	Below Depth	No Find
K2G9F7	K2G9F7-00003	4.40	6.50	Below Depth	No Find
K2G9F7	K2G9F7-00004	3.90	3.20	Below Depth	No Find
K2G9F7	K2G9F7-00005	3.70	6.50	Below Depth	No Find
K2G9F7	K2G9F7-00006	3.60	4.60	Below Depth	No Find
K2G9F7	K2G9F7-00007	3.30	0.00	No Find	No Find
K2G9F7	K2G9F7-00008	3.10	0.00	No Find	No Find
K2G9F7	K2G9F7-00009	2.70	0.00	No Find	No Find
K2G9G7	K2G9G7-00002	3.70	5.20	Below Water	No Find
K2G9G7	K2G9G7-00004	3.10	1.20	Below Water	No Find
K2G9G7	K2G9G7-00006	2.60	4.70	Below Water	No Find
K2G9J7	K2G9J7-00002	2.00	0.10	Below Water	No Find
K2H9A0	K2H9A0-RM-00001	3.02	0.00	No Find	No Find
K2H9A7	K2H9A7-RM-00008	999.00	1.40	No Find	No Find
K2H9A8	K2H9A8-00001	2.60	0.10	Below Water	No Find

Table 2-1

Summary of "No Finds" During ECA Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Grid	Anomaly ID	Initial Amplitude* mV	Reacquire Amplitude mV	Item Group	Item Class
K2H9A8	K2H9A8-00002	2.00	0.10	Below Water	No Find
K2H9A8	K2H9A8-00003	1.70	0.10	Below Water	No Find
K2H9A8	K2H9A8-RM-00005	1.82	6.80	No Find	No Find
K2H9A9	K2H9A9-RM-00026	3.26	0.00	No Find	No Find
K2H9B7	K2H9B7-RM-00003	2.64	1.50	No Find	No Find
K2H9B7	K2H9B7-RM-00006	1.89	6.90	No Find	No Find
K2H9B8	K2H9B8-00001	3.70	0.10	Below Water	No Find
K2H9B8	K2H9B8-00002	2.80	0.10	Below Water	No Find
K2H9B8	K2H9B8-RM-00004	3.67	1.50	No Find	No Find
K2H9B8	K2H9B8-RM-00010	2.64	1.50	No Find	No Find
K2H9B8	K2H9B8-RM-00011	2.84	1.60	No Find	No Find
K2H9B8	K2H9B8-RM-00012	1.30	8.00	No Find	No Find
K2H9B9	K2H9B9-RM-00012	19.54	0.00	No Find	No Find
K2H9B9	K2H9B9-RM-00017	8.93	0.00	No Find	No Find
K2H9B9	K2H9B9-RM-00018	8.76	0.00	No Find	No Find
K2H9C8	K2H9C8-RM-00004	1.78	9.50	No Find	No Find
K2H9C8	K2H9C8-RM-00013	1.74	9.60	No Find	No Find
K2H9C9	K2H9C9-RM-00004	3.43	0.00	No Find	No Find
K2H9C9	K2H9C9-RM-00006	2.48	0.00	No Find	No Find
K2H9D8	K2H9D8-00001	2.60	0.10	Below Water	No Find
K2H9D8	K2H9D8-RM-00012	999.00	1.60	No Find	No Find
K2H9D8	K2H9D8-RM-00013	999.00	1.80	No Find	No Find
K2H9D8	K2H9D8-RM-00015	999.00	1.90	No Find	No Find
K2H9E8	K2H9E8-00002	3.20	0.10	Below Water	No Find
K2H9E8	K2H9E8-00003	2.90	0.10	Below Water	No Find
K2H9E8	K2H9E8-00004	2.60	0.10	Below Water	No Find
K2H9E8	K2H9E8-RM-00015	999.00	0.50	No Find	No Find
K2H9E8	K2H9E8-RM-00016	999.00	0.60	No Find	No Find
K2H9F9	K2H9F9-00001	2.60	0.10	Below Water	No Find
K2H9F9	K2H9F9-RM-00010	999.00	0.70	No Find	No Find
K2H9G8	K2H9G8-RM-00001	999.00	0.70	No Find	No Find
K2H9G9	K2H9G9-00002	2.80	0.10	Below Water	No Find
K2H9G9	K2H9G9-00003	2.70	0.10	Below Water	No Find
K2H9G9	K2H9G9-00004	2.60	0.10	Below Water	No Find
K2H9G9	K2H9G9-RM-00019	2.90	0.80	No Find	No Find
K2H9G9	K2H9G9-RM-00020	1.11	5.00	No Find	No Find
K2H9G9	K2H9G9-RM-00022	1.35	6.50	No Find	No Find

Table 2-1

Summary of "No Finds" During ECA Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Grid	Anomaly ID	Initial Amplitude* mV	Reacquire Amplitude mV	Item Group	Item Class
K2H9G9	K2H9G9-RM-00023	2.42	5.20	No Find	No Find
K2H9G9	K2H9G9-RM-00024	1.25	5.80	No Find	No Find
K2H9G9	K2H9G9-RM-00025	1.49	6.10	No Find	No Find
K2H9G9	K2H9G9-RM-00026	1.33	6.20	No Find	No Find
K2H9G9	K2H9G9-RM-00027	2.53	0.80	No Find	No Find
K2H9G9	K2H9G9-RM-00029	999.00	0.90	No Find	No Find
K2H9G9	K2H9G9-RM-00030	999.00	0.90	No Find	No Find
K2H9G9	K2H9G9-RM-00031	999.00	1.00	No Find	No Find
K2H9G9	K2H9G9-RM-00032	999.00	1.30	No Find	No Find
K2H9G9	K2H9G9-RM-00033	999.00	1.40	No Find	No Find
K2H9H9	K2H9H9-00002	2.00	0.10	Below Water	No Find
K2H9I0	K2H9I0-RM-00005	1.13	2.60	No Find	No Find
K2H9I0	K2H9I0-RM-00006	1.50	2.20	No Find	No Find
K2H9I9	K2H9I9-RM-00005	1.90	10.00	No Find	No Find
K2H9I9	K2H9I9-RM-00010	999.00	2.00	No Find	No Find
K2H9I9	K2H9I9-RM-00011	999.00	2.00	No Find	No Find
K2H9I9	K2H9I9-RM-00012	999.00	2.00	No Find	No Find
K2H9J0	K2H9J0-00001	3.80	0.80	Below Water	No Find
K2H9J0	K2H9J0-RM-00006	1.87	2.80	No Find	No Find
K2H9J0	K2H9J0-RM-00007	1.74	2.90	No Find	No Find
K2H9J0	K2H9J0-RM-00008	1.63	3.10	No Find	No Find
K2H9J0	K2H9J0-RM-00010	1.64	3.10	No Find	No Find
K2H9J0	K2H9J0-RM-00011	1.63	3.10	No Find	No Find
K2H9J9	K2H9J9-00001	4.40	0.70	Below Water	No Find
K2H9J9	K2H9J9-00002	3.90	1.00	Below Water	No Find
K2H9J9	K2H9J9-RM-00006	1.12	3.10	No Find	No Find
K2H9J9	K2H9J9-RM-00007	1.31	3.40	No Find	No Find
K2H9J9	K2H9J9-RM-00009	1.23	4.10	No Find	No Find
K2H9J9	K2H9J9-RM-00010	1.14	4.50	No Find	No Find
K2I0F1	K2I0F1-V-00002	3.97	0.00	No Find	No Find
K2I9A0	K2I9A0-00001	8.80	0.50	Below Water	No Find
K2I9A0	K2I9A0-00002	5.10	0.50	Below Water	No Find
K2I9A0	K2I9A0-00004	3.10	0.30	Below Water	No Find
K2I9A0	K2I9A0-00005	2.80	0.00	No Find	No Find
K2I9A0	K2I9A0-00006	2.60	0.00	No Find	No Find
K2I9A0	K2I9A0-00008	2.50	0.00	No Find	No Find
K2I9A0	K2I9A0-RM-00014	1.19	4.70	No Find	No Find

Table 2-1

Summary of "No Finds" During ECA Intrusive Anomaly Investigation Conducted Between May 2010 and February 2011

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Grid	Anomaly ID	Initial Amplitude* mV	Reacquire Amplitude mV	Item Group	Item Class
K2I9A0	K2I9A0-RM-00017	1.85	4.80	No Find	No Find
K2I9A0	K2I9A0-RM-00018	1.23	5.00	No Find	No Find
K2J0D2	K2J0D2-V-00008	3.05	0.00	No Find	No Find
K2J0F3	K2J0F3-V-00001	3.93	0.00	Below Depth	No Find
K3F1I2	K3F1I2-RM-00035	2.18	0.00	No Find	No Find
K3F1J2	K3F1J2-RM-00005	13.53	0.00	No Find	No Find
K3F1J2	K3F1J2-RM-00007	6.03	0.00	No Find	No Find
K3F1J4	K3F1J4-RM-00004	7.66	0.00	No Find	No Find

mV millivots

* Anomalies with an initial amplitude of 999 were designated as anomaly polygons. The 999 mV value was given as the initial mV readings for all polygons

TABLE 2-2
Summary of Samples Collected
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Site	Investigation Field Work and Associated Report	Decision Unit[9]	Media Samples[1]	Analytes	Date	Sample Identification[8]	Sample Depth
ECA	East Vieques Background Soil Inorganics Investigation	Ti geologic unit	10 SS, 9 SB	TAL inorganics[10], Explosives[11], pH, TOC, redox and cation exchange capacity	6-7/2006	EBGTI-SS01-06-06B, EBGTI-SS02-06-06B, EBGTI-SS03-06-06B, EBGTI-SS04-06-06B, EBGTI-SS05-06-06B, EBGTI-SS06-06-06B, EBGTI-SS07-06-06B, EBGTI-SS08-06-06B, EBGTI-SS09-06-06B, EBGTI-SS10-06-06B, EBGTI-SB02-12-06B, EBGTI-SB03-61-06B, EBGTI-SB04-62-06B, EBGTI-SB05-61-06B, EBGTI-SB06-12-06B, EBGTI-SB07-61-06B, EBGTI-SB08-62-06B, EBGTI-SB09-61-06B, EBGTI-SB10-62-06B,	0 to 6 inches bgs-All SS samples, 6-inches to 1 ft bgs EBGTI-SB03-61-06B, EBGTI-SB05-61-06B, EBGTI-SB07-61-06B, and EBGTI-SB09-61-06B 6-inches to 1.5 ft bgs-EBGTI-SB04-62-06B, EBGTI-SB06-12-06B 6-inches to 2 ft bgs-EBGTI-SB02-12-06B, EBGTI-SB08-62-06B, EBGTI-SB10-62-06B,
	RI sample collection January/February 2011 (CH2M HILL, 2011)	Beach Decision Unit (1)	2 SMI	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-1SMI01-0211, VEECA-1SMI02-0211	0 to 2.5 inches bgs
			2 SS	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-1SB01-1H02-0211, VEECA-1SB02-1H02-0211**	1.5 to 2 feet bgs: VEECA-1SB01-1H02-0211, VEECA-1SB02-1H02-0211
		Lowland Decision Unit (2)	5 SMI	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-2SMI01-0211, VEECA-2SMI02-0211, VEECA-2SMI03-0211, VEECA-2SMI04-0211, VEECA-2SMI05-0211	0 to 2.5 inches bgs
			2 SS	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-2SB03-0001-0211, VEECA-2SB13-000H-0211	0 to 6 inches bgs: VEECA-2SB13-000H-0211 0 to 1 foot bgs: VEECA-2SB03-0001-0211
			13 SB	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-2SB01-0103-0211**, VEECA-2SB02-0103-0211**, VEECA-2SB04-0507-0211**, VEECA-2SB05-0507-0211**, VEECA-2SB06-0507-0211**, VEECA-2SB07-0H2H-0211**, VEECA-2SB08-0204-0211**, VEECA-2SB09-4H6H-0211**, VEECA-2SB10-0204-0211**, VEECA-2SB11-7H9H-0211**, VEECA-2SB12-0H2H-0211**, VEECA-2SB14-1H3H-0211**, VEECA-2SB15-0406-0211**	0.5 to 2.5 feet bgs: VEECA-2SB07-0H2H-0211, VEECA-2SB12-0H2H-0211 1.5 to 3.5 feet bgs: VEECA-2SB14-1H3H-0211 1 to 3 feet bgs: VEECA-2SB01-0103-0211, VEECA-2SB02-0103-0211 2 to 4 feet bgs: VEECA-2SB08-0204-0211, VEECA-2SB10-0204-0211 4 to 6 feet bgs: VEECA-2SB15-0406-0211 4.5 to 6.5 feet bgs: VEECA-2SB09-4H6H-0211 5 to 7 feet bgs: VEECA-2SB04-0507-0211, VEECA-2SB05-0507-0211, VEECA-2SB06-0507-0211 7.5 to 9.5 feet bgs: VEECA-2SB11-7H9H-0211
		Lagoon Fringe Decision Unit (3)	5 SMI	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-3SMI01-0211, VEECA-3SMI02-0211, VEECA-3SMI03-0211, VEECA-3SMI04-0211, VEECA-3SMI05-0211	0 to 2.5 inches bgs
			5 SS	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-3SB01-0001-0211, VEECA-3SB02-0001-0211, VEECA-3SB03-0002-0211, VEECA-3SB04-001H-0211, VEECA-3SB05-0002-0211	0 to 1 foot bgs: VEECA-3SB01-0001-0211, VEECA-3SB02-0001-0211 0 to 1.5 feet bgs: VEECA-3SB04-001H-0211 0 to 2 feet bgs: VEECA-3SB03-0002-0211, VEECA-3SB05-0002-0211
		Upland Decision Unit (4)	15 SMI	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-4SMI01-0211, VEECA-4SMI02-0211, VEECA-4SMI03-0211, VEECA-4SMI04-0211, VEECA-4SMI05-0211, VEECA-4SMI06-0211, VEECA-4SMI07-0211, VEECA-4SMI08-0211, VEECA-4SMI09-0211, VEECA-4SMI10-0211, VEECA-4SMI11-0211, VEECA-4SMI12-0211, VEECA-4SMI13-0211, VEECA-4SMI14-0211, VEECA-4SMI15-0211	0 to 2.5 inches bgs
			2 SS	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-4SB01-001H-0211, VEECA-4SS01-0001-0211*	0 to 1 foot bgs: VEECA-4SS01-0001-0211 0 to 1.5 feet bgs: VEECA-4SB01-001H-0211
		Lagoon Decision Unit (5)	15 SD	Explosives[2], Total Metals[3], Wet Chemistry[4,5], Grain Size[6]	02/2011	VEECA-5SD01-000H-0211, VEECA-5SD02-000H-0211, VEECA-5SD03-000H-0211, VEECA-5SD04-000H-0211, VEECA-5SD05-000H-0211, VEECA-5SD06-000H-0211, VEECA-5SD07-000H-0211, VEECA-5SD08-000H-0211, VEECA-5SD09-000H-0211, VEECA-5SD10-000H-0211, VEECA-5SD11-000H-0211, VEECA-5SD12-000H-0211, VEECA-5SD13-000H-0211, VEECA-5SD14-000H-0211, VEECA-5SD15-000H-0211	0 to 6 inches bgs
			5 SW	Explosives[2], Total Metals[3], Dissolved Metals[7]	02/2011	VEECA-5SW01-0211, VEECA-5SW02-0211, VEECA-5SW03-0211, VEECA-5SW04-0211, VEECA-5SW05-0211	Mid-Column
		Incremental Background	10 SMI	Explosives[2], Total Metals[3], Wet Chemistry[4]	02/2011	VEECA-6SMI01-0211***, VEECA-6SMI02-0211***, VEECA-6SMI03-0211***, VEECA-6SMI04-0211***, VEECA-6SMI05-0211***, VEECA-6SMI06-0211***, VEECA-6SMI07-0211***, VEECA-6SMI08-0211***, VEECA-6SMI09-0211***, VEECA-6SMI10-0211***	0 to 2.5 inches bgs

[1] SS=Surface soil sample, SMI=Incremental Sample, SB=Subsurface soil sample, SD=Sediment sample, SW=Surface water sample
[2] Explosives by SW-846 8330B; Perchlorate by SW-846 6850
[3] Total Metals (ICP-AES) by SW-846 6010B; Total Metals (ICP-MS) by SW-846 6020; Hexavalent chromium by SW-846 7196A
[4] pH by SW-846 9045C
[5] TOC by Lloyd Kahn
[6] Grain Size (Sieve Only, No Hydrometer) by ASTM D422
[7] Dissolved Metals (ICP-AES) by SW-846 6010B; Dissolved Metals (ICP-MS) by SW-846 6020; Filtered Hexavalent chromium by SW-846 7196A
[8] No duplicate or triplicate samples are included in this table.
[9] The parenthetical number following each decision unit name refers to the decision unit number.
[10] TAL Inorganics by Method ILM05.3
[11] Explosives by Method SW846 8330
* Samples not analyzed for explosives.
** Samples not analyzed for pH.
bgs = below ground surface.
RI = Remedial Investigation

TABLE 2-3

MEC/MD Removed from the Sampling Units During Surface Clearance

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Sample Unit	Bombs Quantity	Flares-Pyrotechnics Quantity	MEC Component Quantity	Projectiles / Mortars Quantity	Rockets / Guided Missiles Quantity	Submunitions Quantity	MD/RRD Quantity
Beach 1	0	0	0	0	2	1	2
Beach 2	0	1	0	0	0	1	3
Lagoon Fringe 1	0	0	1	1	0	0	4
Lagoon Fringe 2	0	0	0	0	0	0	3
Lagoon Fringe 3	0	0	0	0	0	0	0
Lagoon Fringe 4	0	0	0	0	0	0	2
Lagoon Fringe 5	0	0	0	0	10	0	0
Lagoon	5	0	38	1034	89	0	179
Lowland 1	1	1	0	4	0	0	20
Lowland 2	0	0	0	2	2	0	27
Lowland 3	1	0	0	2	4	0	10
Lowland 4	1	0	0	2	1	0	20
Lowland 5	0	1	0	2	0	1	10
Upland 1	0	1	0	3	2	0	8
Upland 2	2	0	0	0	2	0	10
Upland 3	2	1	0	7	1	0	4
Upland 4	0	2	0	2	0	1	21
Upland 5	0	0	1	0	3	0	7
Upland 6	0	1	0	1	3	0	6
Upland 7	1	0	0	2	3	0	6
Upland 8	0	0	0	2	0	0	4
Upland 9	0	0	1	1	2	1	55
Upland 10	0	3	1	2	0	1	37
Upland 11	0	1	0	3	1	0	26
Upland 12	2	0	0	0	0	0	3
Upland 13	0	0	0	3	1	0	7
Upland 14	0	0	0	2	0	0	11
Upland 15	1	1	0	0	0	0	9

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-1 - Mec Removal Area.mxd6/15/2012

ECA NTCRA Subsurface MEC Removal Area

ECA TCRA Surface MEC Removal Area

Obstructed area where DGM Survey could not be completed

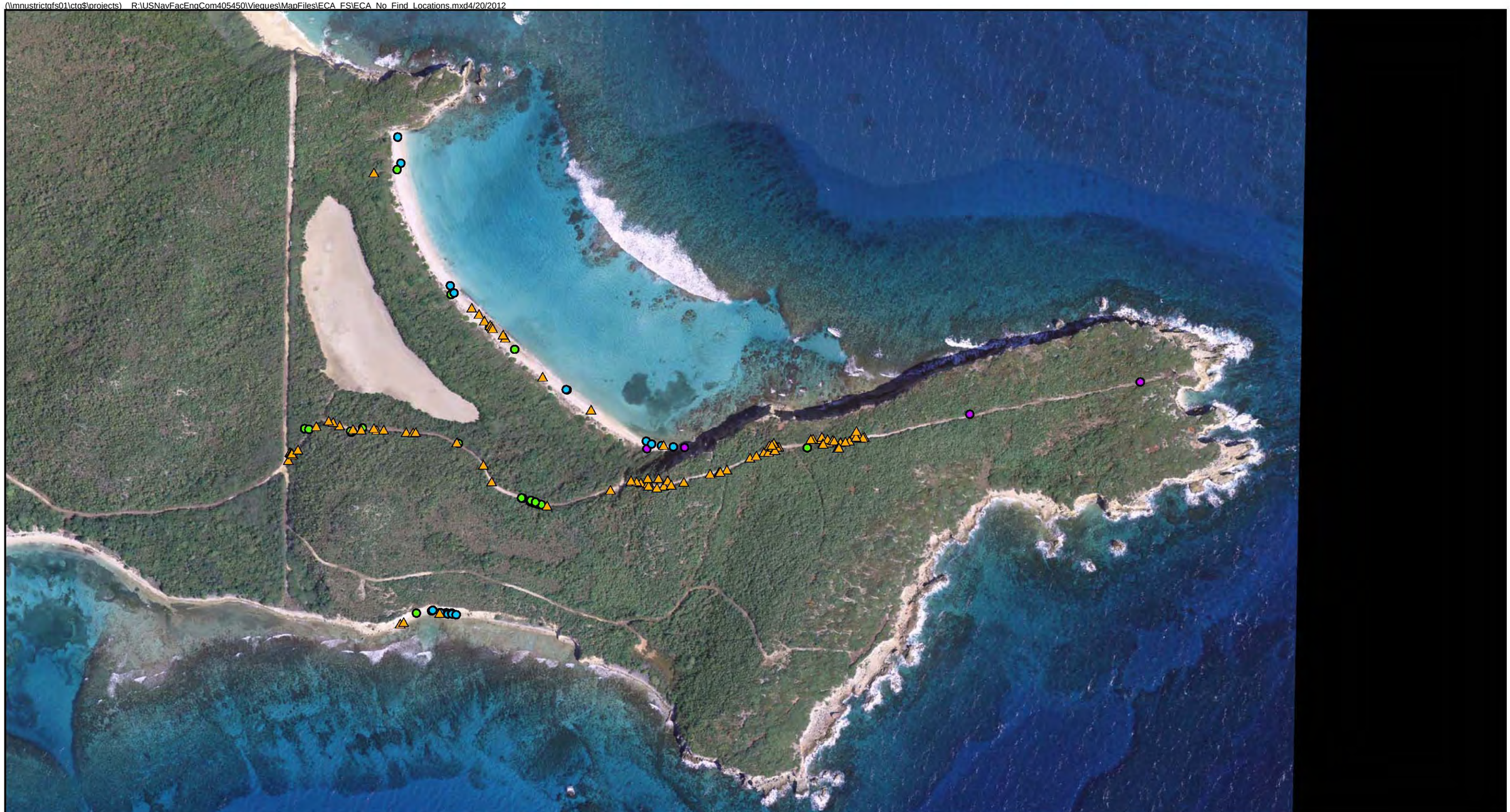
N
W E
S

0 200 400
Feet

Figure 2-1
MEC Removal Areas
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL®

(\\mnustrictqfs01\ctq$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_FS\ECA_No_Find_Locations.mxd4/20/2012

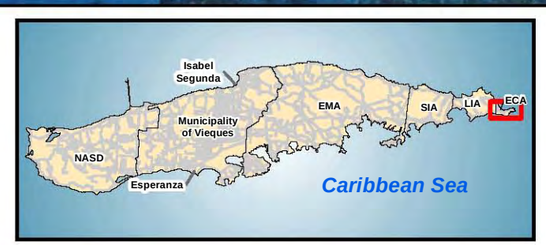


No find – reacquisition mV below 2.5 mV threshold

Below Depth

Below Water

No Find



N
W E
S

0 200 400
Feet

Figure 2-2
ECA No Find Locations
UXO 1, Eastern Conservation Area
Former Vieques Naval Training Range
Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_2-2_Locations_of_Detonation_Events.mxd11/9/2011

Detonation Events

ECA Boundary

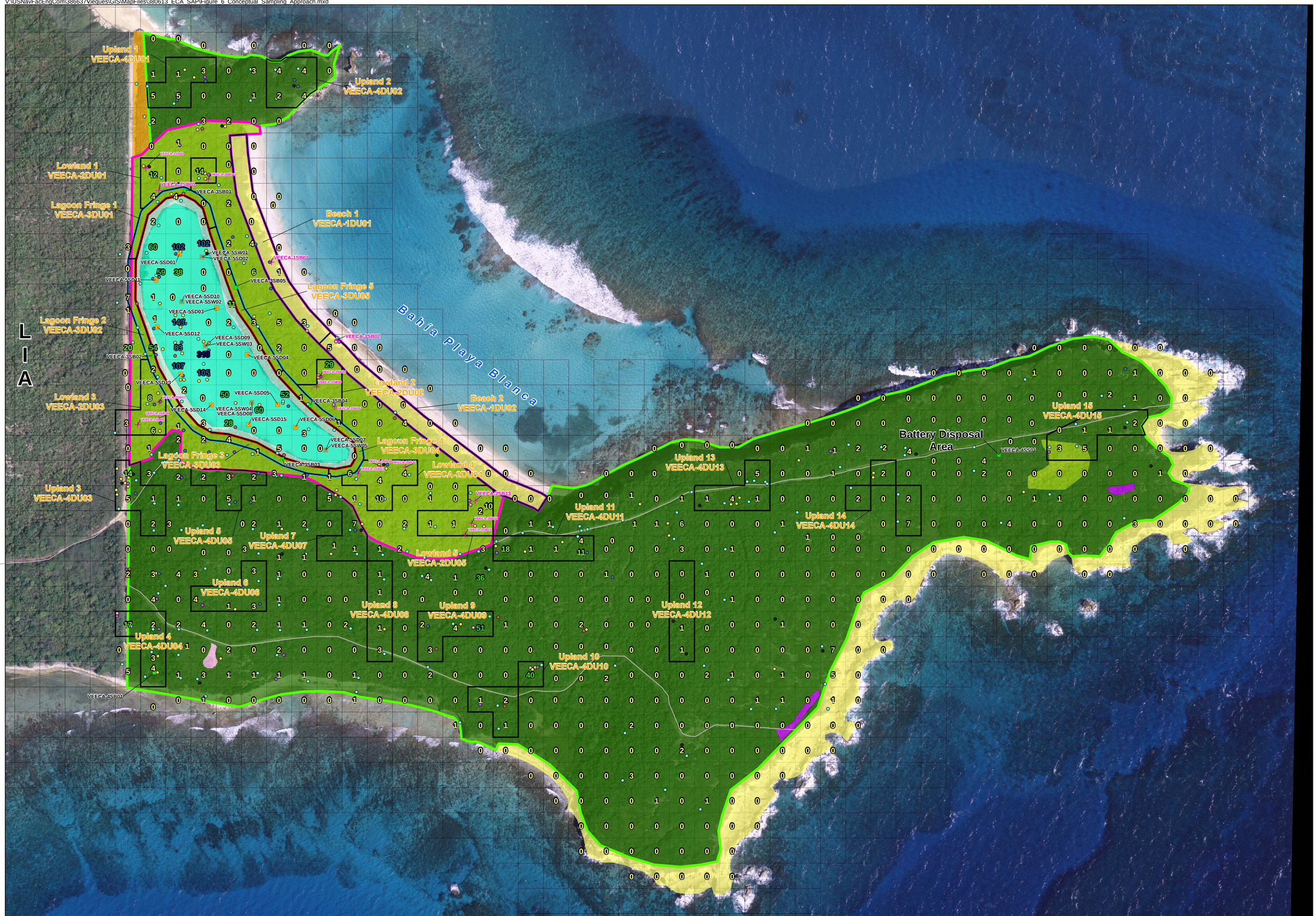
N
W E
S

0 200 400
Feet

Figure 2-3
Locations of Detonation Events
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL®

V:\USNavFacEngCom\386637Vieques\GIS\MapFiles\380613_ECA_SAP\Figure_6_Conceptual_Sampling_Approach.mxd



Legend

- Subsruface Soil Sample
- Surface Water Sample
- Sediment Sample
- Surface Soil Sample
- Sampling Units

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe

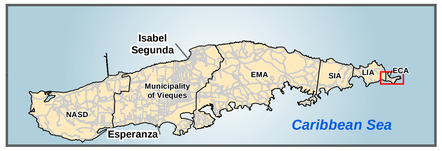
- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- Submunitions
- Munitions Scrap

Land Cover

- Bare Ground
- Beach
- Evergreen Scrub
- Forest Scrub
- Mangrove
- Open Water
- Salt/Sand Flat
- Sparse Thorn Scrub

Quantity of Item Findings (MEC and Munitions Scrap)

- 0 - 5
- 5 - 10
- 10 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- 100 - 200
- 200 - 300
- ▶ 300



N
W E
S

0 60 120 240
Feet

FIGURE 2-4
ECA Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

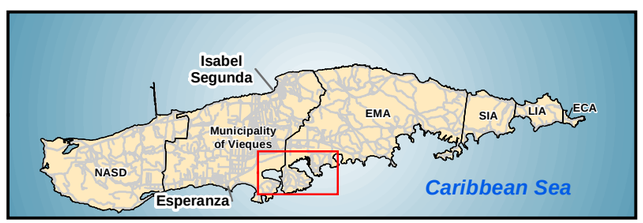
CH2MHILL

ES060211161657TPA

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-4 Background Sample Location Map.mxd3/21/2012

Legend

- October 2007 Background Study Soil Sample Location
- Background Incremental Sampling Unit
- Geologic Unit
  - Ti - Tertiary Limestones and Dolomites
  - Qa - Alluvial Deposits
  - Qb - Beach and Dune Deposits
  - KTd-Plutonic rocks, largely granidiorite and quartz diorite



N
W E
S

0 500 1,000 2,000 Feet

2007 Aerial Image

Figure 2-5
Background Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

Photo A: Beach Decision Unit

Photo B: Lagoon Decision Unit

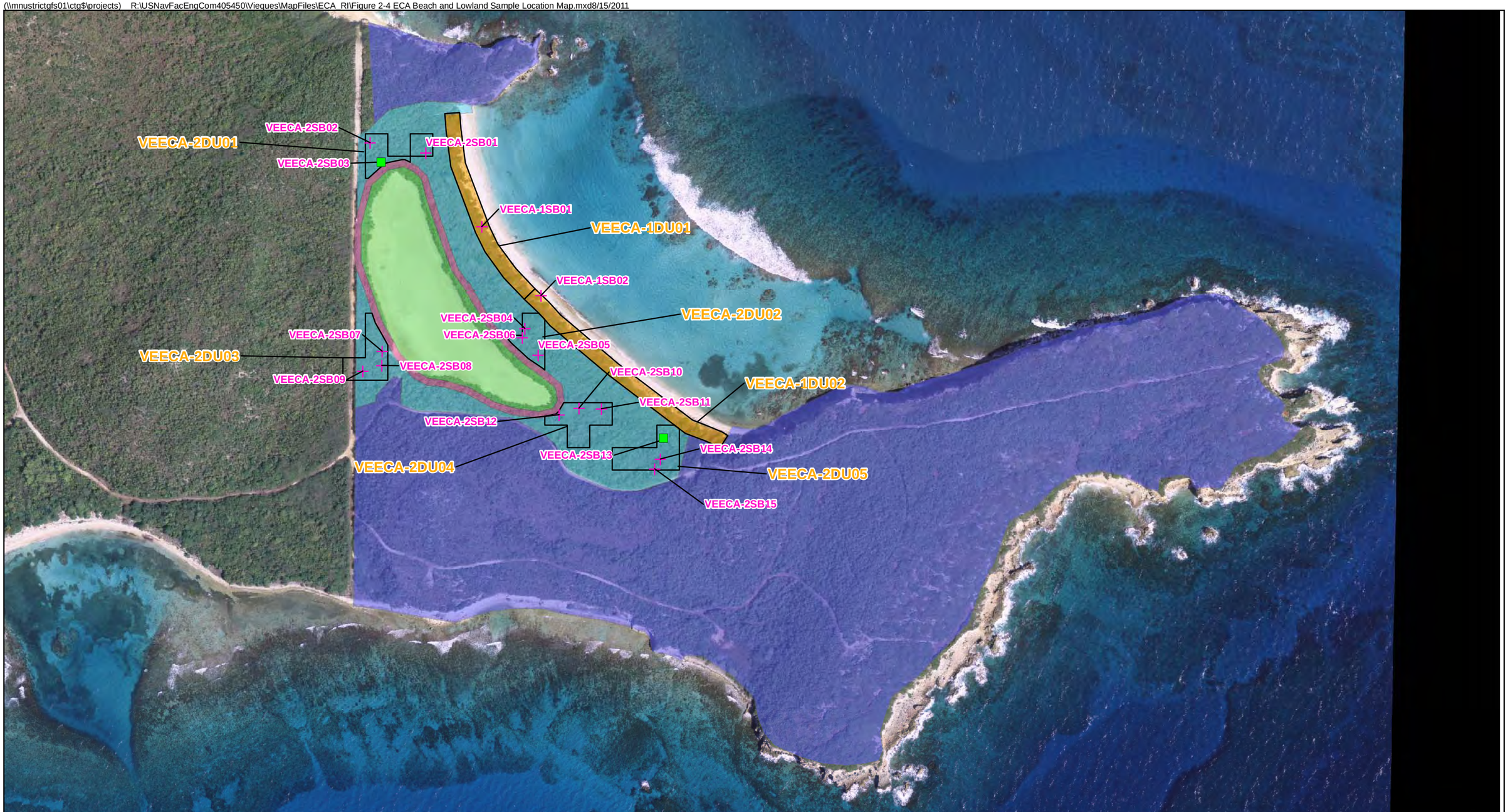
Photo C: Upland Decision Unit

Photo D: Lagoon Fringe Decision Unit

Photo E: Lowland Decision Unit

FIGURE 2-6
ECA Site Photographs
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



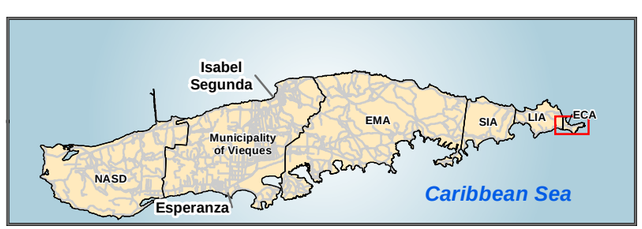
Legend

- Subsurface Soil Sample
- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

Name

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

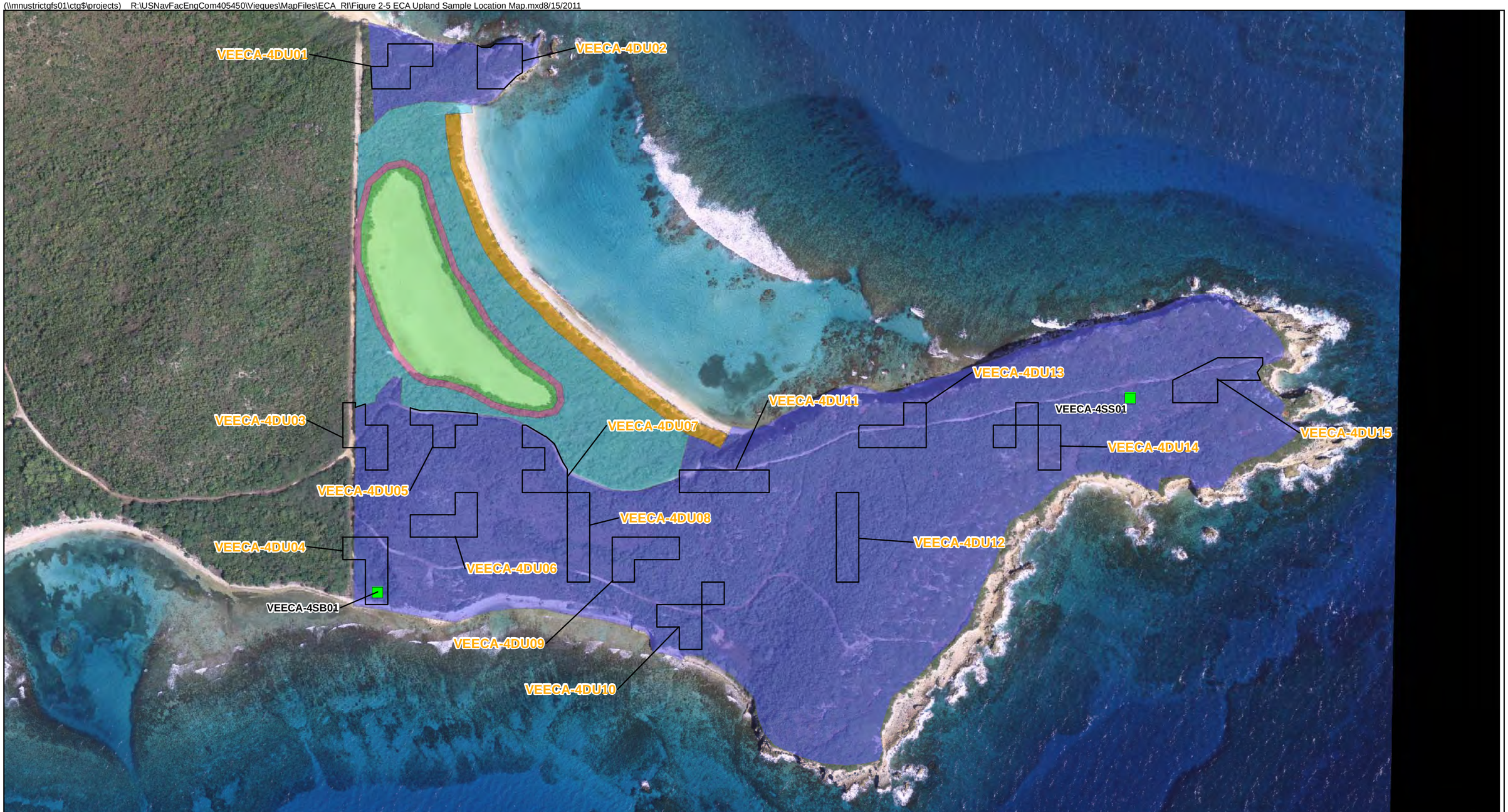
0 500 1,000 Feet

2007 Aerial Image

FIGURE 2-7
ECA Beach and Lowland Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-5 ECA Upland Sample Location Map.mxd8/15/2011

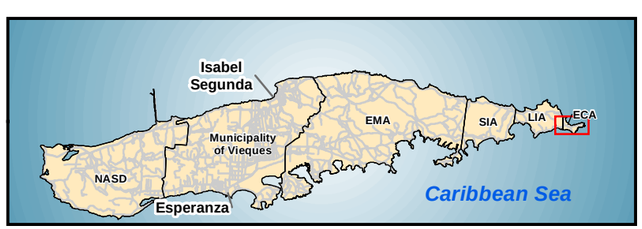


Legend

- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

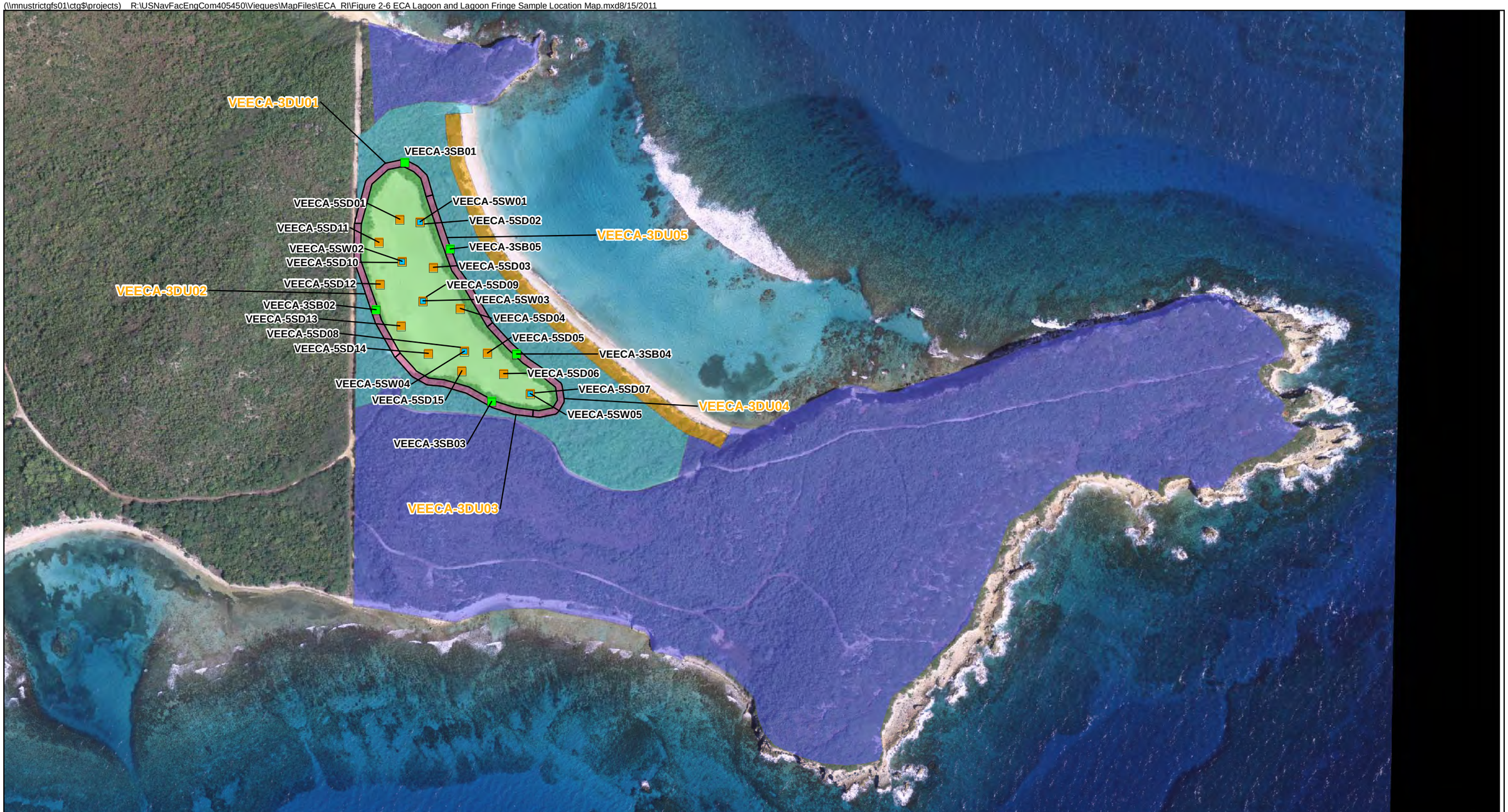
0 500 1,000 Feet

2007 Aerial Image

FIGURE 2-8
ECA Upland Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2-6 ECA Lagoon and Lagoon Fringe Sample Location Map.mxd8/15/2011

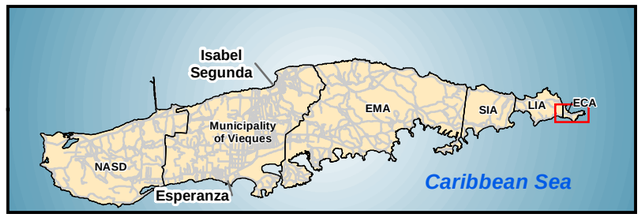


Legend

- Sediment Sample
- Surface Water Sample
- Surface Soil Sample
- Decision Unit (Area of Incremental Sampling)

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

0 200 400 800 Feet

2007 Aerial Image

FIGURE 2-9
ECA Lagoon and Lagoon Fringe Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

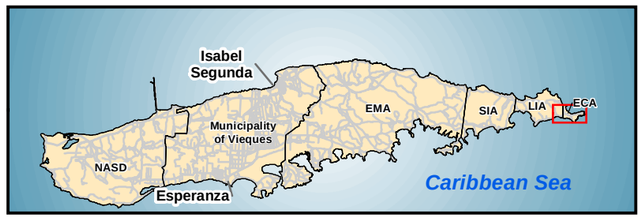
CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\F2-9 Proposed_vs_Actual_Soil_Sample_Locations.mxd1/10/2012

Final Sample Location
Proposed Sample Location

Decision Unit Boundary
- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe

Land Cover
- Bare Ground
- Beach
- Evergreen Scrub
- Forest Scrub
- Mangrove
- Open Water
- Salt/Sand Flat
- Sparse Thorn Scrub



N
W E
S

0 200 400 800 Feet

2007 Aerial Image

Figure 2-10
Sample Location Deviations
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL®

SECTION 3

Physical Characteristics

This section presents an evaluation of the physical characteristics pertaining to the surface and subsurface features, and a brief discussion of the ecological characteristics and cultural and archaeological resources found within UXO 1. The physical characteristics are important to describe the primary mechanisms that control the fate and migration of contaminants. The physical and ecological characteristics also support the human health and ecological risk assessments.

3.1 Physical Setting

This subsection summarizes the physical setting of UXO 1, including meteorology, topography, surface water drainage, and geology and hydrogeology.

3.1.1 Meteorology

The climate of Vieques is tropical-marine. Temperatures are nearly constant with an annual average temperature of about 79°F; August is the warmest month, with an average temperature of 82°F and February the coolest, with an average temperature of 76°F (Greenleaf/Telesca et. al., 1984). Vieques lies in the path of the prevailing easterly trade winds, regulating the climate. The trade winds result in a rainfall pattern characterized by a dry season from December through April and a rainy season from May through November. Due to tropical low pressure systems carried by the trade winds, heavy precipitation results from tropical storms to occasional hurricanes from June to November (Bonnin, 2006). The far eastern part of the island, where UXO 1 is located, averages approximately 38 inches of rainfall per year.

3.1.2 Topography

The topography of eastern Vieques is characterized by a series of rolling hills, peaks, and small valleys that are intersected by a series of ephemeral stream drainage features (known locally as quebradas), and narrow, low lying coastal areas. The most elevated areas occur along a west to east axis near the center of the former VNTR. In general, the former VNTR slopes gradually downward from the center of the island to the coastal areas.

The topography of UXO 1 ranges from 0 ft above mean sea level (amsl) at the perimeter (i.e., ocean boundary) to above 60 ft amsl on the eastern portion (**Figure 3-1**). The northern, eastern, and southwestern portions are topographically higher (considered upland areas) that generally slope toward the inland lagoon and the ocean. Large cliff faces separate the ocean from the land, except at Playa Blanca.

3.1.3 Surface Water Hydrology

A 9-acre unnamed lagoon partially surrounded by a narrow fringe of mangroves is present in the northwestern portion of UXO 1 (denoted as the ECA Lagoon in this RI Report). During the ecological setting evaluation of the lagoon, it was noted that a clay layer underlies the lagoon. This clay layer restricts or prevents hydraulic connection between the surface water in the lagoon and the underlying groundwater. This hydraulic barrier, as well as the physical barrier between the ocean and the lagoon, account for the lagoon not being tidally influenced and the presence of water in the lagoon being wholly or mostly the result of precipitation. During dry periods, the lagoon has been observed to dewater, with salts appearing on the lagoon flat. The lagoon has been isolated from the adjacent Bahia Playa Blanca by a stretch of forested upland since 1937, based on historic aerial photographs. Surface water quality parameters measured from the lagoon are discussed in Section 3.2. Bahia Playa Blanca, the offsite coastal lagoon at the north side of the ECA (**Figure 3-1**), is not part of UXO 1 and is therefore not evaluated as part of this RI. No ephemeral streams occur within UXO 1.

3.1.4 Geology

The geology of Vieques is characterized by volcanic rocks generally overlain by alluvial deposits and limestone. Volcanic andesites of late Cretaceous age were deposited in a marine environment and intruded by a quartz-diorite pluton of late Cretaceous to Eocene age. Much of the bedrock is exposed over the island with exceptions where it is

overlain by limestone of Tertiary age and alluvial, beach, and swamp deposits of Quaternary age. Limestone only occurs within portions of the north, south, and eastern parts of the island. The beach and dune deposits of sand are primarily composed of calcite, quartz, and volcanic rock fragments. Soil on Vieques is predominantly chemically weathered remnants of parent bedrock due to the climate conditions and susceptibility of the parent rock type to chemical weathering (U.S. Geological Survey [USGS], 1989).

The geology of UXO 1 is characterized as limestone and dolomite primarily exposed at the ground surface, and beach sand at Bahia Playa Blanca beach (USGS, 1989) (**Figure 3-2**). Lithologic data collected during the subsurface soil sampling also provide descriptions of the shallow subsurface geology (**Appendix B**). The upland areas generally contain bedrock exposed at the surface, loose stones, and very shallow soil between exposed bedrock. Within the lowland areas, beach sands intermixed with limestone are encountered at the surface. Sediment within the lagoon is primarily silt and clay with limited organic matter.

3.1.5 Hydrogeology

The two main aquifers on Vieques are the Esperanza and Resolucion Valley aquifers that are recharged by rainfall (**Figure 3-3**). The Esperanza aquifer occurs within the central portion of the island, and the Resolucion Valley aquifer occurs within the western portion of the island. The Esperanza aquifer occurs only within the westernmost portion of the former VNTR. UXO 1 is located over 6 miles from the eastern boundary of the Esperanza aquifer.

Percolating rainwater infiltrates downwards within the Karst terrain and fractures of the limestone and dolomite of UXO 1. Limestone typically does not have impermeable surfaces to cause perched groundwater conditions, especially under Karst conditions. Groundwater within UXO 1 primarily occurs within the limestone and dolomite bedrock; however, groundwater was encountered within unconsolidated sand at a depth of 1 ft below ground surface adjacent to the lagoon (based on lithologic descriptions) (**Appendix B**). The groundwater table is likely encountered near sea level and tidally influenced. Groundwater discharge is to the ocean and is not believed to perennially discharge to the lagoon since the lagoon is periodically dry. Groundwater seeps were not observed along the cliff faces. The general groundwater geochemistry is likely brackish to saline and hard.

Groundwater was not characterized as part of the investigation primarily because the data collected from the other media (soil, surface water, and sediment) suggest minimal contamination is present at the site and that even where present, the concentrations are low (with respect to screening criteria, including leaching). Soil data collected during the ECA RI suggest contaminant leaching to groundwater is not a concern, as discussed in Section 5.2.2. In addition 1) groundwater likely only discharges to the ocean and not to the lagoon or through the limestone cliff faces; 2) groundwater will not flow to other areas of Vieques where it could impact existing or future groundwater users; 3) groundwater use cannot occur at UXO 1 due to development restriction at the site by a Congressional Order (discussed further in Section 3.1.6); and 4) the general groundwater geochemistry would be hard (due to the limestone bedrock) and brackish to saline as it is likely tidally influenced and subject to saltwater mixing.

3.1.6 Land and Water Use

The former VNTR occupies approximately 14,600 acres, most of which is undeveloped, and is bound by the Municipality of Vieques to the west, and the Caribbean Sea to the north, south, and east. The Navy transferred the land containing UXO 1 to the administrative jurisdiction of the DOI. The site is managed under the National Wildlife Refuge System Administration Act by the DOI's USFWS, Caribbean Division. The legislation that mandated the establishment of the wildlife refuge specifically states that any land transfer would require congressional approval.

A Comprehensive Conservation Plan/Environmental Impact Statement (CCP/EIS) for the Vieques National Wildlife Refuge was completed by USFWS, which outlines the land use plan for managing the former VNTR as a wildlife refuge (DOI, 2007). Based on the CCP/EIS, roads within UXO 1 will be used to provide USFWS access to natural resource areas, such as the turtle nesting area along the Bahia Playa Blanca beach, and to access the navigation "light post" at the eastern end of UXO 1 for maintenance. However, the CCP/EIS shows no planned public access or groundwater use within UXO 1.

Groundwater beneath UXO 1 is classified by the Commonwealth of Puerto Rico as SG. Groundwater is currently not used as a potable water source at or in the vicinity of the site, nor are there plans for potable use of groundwater in this area. The potable water supply on Vieques is derived from the Rio Blanco on the main island of Puerto Rico.

3.2 Ecological Setting

The description of the environmental setting is based primarily on a biological assessment (BA) for the ECA conducted by Geo-Marine, Inc. (GMI) (Geo-Marine, 2007), which included a survey of listed biological species and critical habitats. Detailed results of the BA, including a complete list of species identified, is included in **Appendix I.** A supplemental qualitative survey of the ECA Lagoon was conducted during the Remedial Investigation (RI) field sampling activities (February 2011).

Habitats types within UXO 1 generally include upland, lowland, lagoon, and beach. The upland habitat type, which occurs at the higher elevations (above about 30 feet msl) and encompasses the majority of UXO 1, is characterized primarily by rough terrain of limestone and dolomite outcroppings, as noted previously. The lowland habitat type generally occurs below an elevation of about 15 feet above mean sea level, where the water table is high or periodically high; the lowland area surrounds the ECA Lagoon and borders the beach (Bahia Playa Blanca). The beach along Bahia Playa Blanca consists of a narrow strip of light-colored beach sand that is saturated with seawater, contains many seashells and shell fragments, and serves as a sea turtle nesting area.

In 2001, GMI conducted an evaluation of the general health and status of the mangrove communities on Navy property on the eastern end of Vieques Island (Geo-Marine, 2002). In this report, the ECA Lagoon is described as an 8.6-acre closed (isolated from the ocean) lagoon (includes open water and/or exposed mudflats, depending upon hydrologic conditions) with 1.0 acre of mangrove, and has an assigned USFWS wetland classification code of E2SS3P (estuarine, intertidal, scrub-shrub, broad-leaved evergreen, irregularly flooded). A review of aerial photos showed that the ECA Lagoon has been isolated from the adjacent ocean since at least 1936. In 1936, the lagoon contained about 100 percent coverage of vegetation, probably mangrove species, but showed a slow decline in coverage until 1985 when nearly all vegetation was absent, replaced with either open water or mudflat.

Vegetation ranges from low-growing, dense vegetation along the eastern edge to forested areas along the west and northwest portions of UXO 1. Six distinct plant communities were identified, including upland, evergreen scrub (also known as subtropical dry forest; 89.9 acres), lowland, forest scrub (18.9 acres), beach (9.5 acres), mangroves (1.0 acres) associated with the ECA Lagoon, salt/sand flat (0.2 acres), and sparse thorn scrub (0.1 acres).

In February 2011, the ECA Lagoon contained about 1 foot of water and was relatively turbid (**Table 3-1**). The average salinity of 20.7 parts per thousand (ppt), while less than that of seawater (about 35 ppt), is indicative of a marine environment. In October 2007, field water quality parameters were measured by NOAA at three ECA Lagoon stations (Bauer and Kendall, 2010). These measurements indicated a salinity of 77.6 ppt (measured only in one sample) and a very shallow water depth of about 1 inch across the lagoon (**Table 3-1**). The lagoon substrate is predominantly silt/clay (**Table 3-2**).

3.2.1 Flora

Plants observed within the ECA Lagoon during the RI sampling activities are listed in **Table 3-3**. Patches of black mangrove (*Avicennia germinans*) and red mangrove (*Rhizophora mangle*) occurred along the lagoon fringe, except for along the western shoreline. A dense groundcover of seaside purslane (*Sesuvium portulacstrum*) grew in the saturated soils of the entire lagoon shoreline, with seashore dropseed (*Sporobolus virginicus*) growing in dense stands further up the shoreline. Extensive areas of widgeon grass (*Ruppi maritima*), a bushy, fan-like underwater plant well adapted to brackish and alkaline water bodies, occurred throughout the lagoon. Widgeon grass is known to provide cover and food for many aquatic wildlife species, such as ducks.

A total of 155 plant species were identified by GMI (Geo-Marine, 2007) throughout UXO 1, primarily in the upland areas. No plant identified as endangered, threatened, or rare was observed. A list of these species is included in **Table 3-3**.

3.2.2 Fauna

A list of mammals, birds, and aquatic invertebrates observed in and around UXO 1 is provided in **Table 3-3**. The only mammal observed was the Indian mongoose (*Herpestes auropunctatus*), a common invasive species on Vieques. No snakes or amphibians were observed. A total of 27 species of birds have been observed by GMI (Geo-Marine, 2007), or by CH2M HILL during the RI sampling event. Many birds were observed foraging in the ECA Lagoon, the most common of which included white-cheeked pintail (*Anas bahamensis*), ruddy turnstone (*Arenaria interpres*), greater yellowlegs (*Tringa melanoleuca*), and blue-winged teal (*Anas discors*).

The qualitative survey of the aquatic habitats in the ECA Lagoon identified few species. The most abundant was the saltpan fiddler crab (*Uca burgersi*), which was commonly associated with the large patches of widgeon grass, including areas well out in the open water. Several damselfly nymphs were found in the widgeon grass. The species could not be identified, but apparently is one that is tolerant of brackish water conditions. No fish were captured, nor were any seen moving in the shallow water during several days of surveying. Considering the fish sampling effort involved using small dip nets around various aquatic structures and open water, it is possible that small fish occur in the lagoon. However, the periodically dry nature of the lagoon may result in the absence of fish. Land crab (*Cardisoma guanhumi*) burrows occur along the eastern side of the lagoon.

3.2.3 Rare, Threatened, and Endangered Species

Thirteen federally listed species are known to occur, or have the potential to occur, on or near the former VNTR (**Table 3-4**). However, no listed plant species were identified at UXO 1 (Geo-Marine, 2007).

A turtle nesting beach occurs along the north side of UXO 1, along Bahia Playa Blanca (Geo-Marine, 2007). Species confirmed having nested along the Bahia Playa Blanca beach include the green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) sea turtles.

No roseate terns (threatened) were observed; however, GMI noted they can occur in the area from May through October, and are known to have historically occurred and/or nested on the ECA beaches. This species typically forages for fish along coastlines and in estuaries, and would not be expected to forage within the ECA Lagoon because of its inland location. The apparent lack or scarcity of fish in the lagoon, based upon the results of the qualitative fish survey described in Section 3.2.2, would also likely preclude foraging activities by this species.

The white-cheeked pintail is not federally listed, but is considered rare in Puerto Rico. Approximately 60 white-cheeked pintails were frequently observed foraging in the widgeon grass throughout the ECA Lagoon during the RI sampling event.

Although several distinct and productive habitats occur in UXO 1, no areas of designated critical habitat were observed.

3.3 Cultural and Archeological Resources

An archaeological survey of UXO 1 was completed in September 2007 (Southeastern Archaeological Research, Inc., 2007). This survey was conducted from August 21, 2007 through September 13, 2007 to determine whether archaeological sites exist within the ECA prior to planned vegetation clearing and munitions removal activities. In summary, two previously unrecorded archaeological sites and one isolated find were identified in the ECA. One Precolumbian site consists of a subsurface shell midden. The shell deposit measures approximately 30 by 40 meters and no additional artifacts were observed. Despite this isolated discovery, the site is likely associated with Precolumbian use of the area because the vicinity affords protection from the sea coast and provides access to the lagoon, a food source. An absence of recovered tools and ceramics suggests the site was not a permanent settlement or long-term habitation, but a temporary resource processing area, probably associated with a nearby habitation site.

Another site consists of a 25 by 30 meter surface scatter of broken shell, coral, and one observed lithic tool. Observed shells consisted predominantly of *Strombus sp.* (conch) fragments including two nearly whole shell specimens with extraction holes. Also observed were large fragmented *Cittarium pica* (West Indian top shell) and pieces of coral that may have served as abraders. A large cobble tool manufactured of dark gray igneous material (possibly basalt) was

also identified. The tool exhibits battering on both ends and contains a flat ventral surface worn smooth from abrading or grinding. No ceramics were observed at the site.

Additionally, an isolated lithic tool was recovered from the ground surface. The tool consists of a large chopper or celt manufactured from a light greenish gray igneous stone. The specimen exhibits a prominent striking platform, a worked dorsal surface, and use wear on its distal end. It had been struck from a larger source stone, possibly basalt or green siltstone.

TABLE 3-1
Water Column Parameter Measurements - ECA Lagoon
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	Date	Time	Depth of Water (ft)	Sample Depth (ft)	Conductivity (umhos/cm)	DO (mg/L)	Salinity (ppt)	Temperature (^{o}C)	pH (SU)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
VEECA-5SW01	2/11/2011	8:50	1.00	0.50	32,880	5.70	20.57	23.50	7.40	865.8	155
VEECA-5SW02	2/11/2011	9:22	1.00	0.50	33,122	6.02	20.73	23.84	7.48	890.9	155
VEECA-5SW03	2/11/2011	9:00	1.05	0.50	33,029	6.12	20.67	23.51	7.54	876.4	197
VEECA-5SW04	2/11/2011	9:12	1.10	0.50	33,141	6.17	20.75	23.68	7.56	881.7	214
VEECA-5SW05	2/11/2011	9:07	1.00	0.50	33,056	5.08	20.69	23.64	7.35	877.2	214
		Average	1.03		33,046	5.82	20.68	23.63	7.47	878.4	187
16P (NOAA)	10/22/2007	--	0.07	--	--	--	--	--	--	--	--
17P (NOAA)	10/22/2007	--	0.07	--	1,800 *	8.23	--	31.5	--	--	--
18P (NOAA)	10/22/2007	--	0.07	--	120,900	5.40	77.6	31.7	--	--	--
		Average	0.07	--	120,900	6.82	77.6	31.6	--	--	--

-- = no data available
* = this value may be an error, considering the much higher conductivity (and corresponding high salinity) at nearby Station 18P, and the expectation of hypersaline conditions in the very shallow water (about 1 inch) relative to deeper water (about 12 inches) conditions in 2011. This value is not included in the site average.
NOAA = National Oceanic and Atmospheric Administration (Bauer, L.J. and M.S. Kendall, 2010)
DO - dissolved oxygen
^{o}C - degrees Celsius
ft - feet
ppt - parts per thousand
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
SU - standard units
mV - millivolts
NTU - Nephelometric Turbidity Units

TABLE 3-2
Physical Sediment Parameter Measurements - ECA Lagoon
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Sample Date	pH (SU)	Total Organic Carbon (MG/KG)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt/Clay (%)
VEECA-5SD01	VEECA-5SD01-000H-0211	2/10/2011	8.00	11,400	0.0	0.0	2.9	8.0	89.1
VEECA-5SD02	VEECA-5SD02-000H-0211	2/10/2011	8.40	10,700	0.0	0.0	6.6	18.9	74.5
VEECA-5SD02	VEECA-5SD02P-000H-0211	2/10/2011	8.40	30,600	NS	NS	NS	NS	NS
VEECA-5SD03	VEECA-5SD03-000H-0211	2/10/2011	8.40	4,850	0.0	0.0	2.7	9.7	87.6
VEECA-5SD04	VEECA-5SD04-000H-0211	2/10/2011	8.30	15,200	0.0	0.0	17.4	28.4	54.2
VEECA-5SD05	VEECA-5SD05-000H-0211	2/10/2011	8.40	5,260	0.0	0.0	2.5	9.1	88.4
VEECA-5SD06	VEECA-5SD06-000H-0211	2/10/2011	8.40	4,620	0.0	0.0	6.0	13.6	80.4
VEECA-5SD07	VEECA-5SD07-000H-0211	2/10/2011	8.30	20,400	0.0	0.0	2.7	8.5	88.8
VEECA-5SD08	VEECA-5SD08-000H-0211	2/10/2011	8.30	17,200	0.0	0.0	3.1	13.2	83.7
VEECA-5SD09	VEECA-5SD09-000H-0211	2/10/2011	8.30	14,000	0.0	0.0	2.0	6.5	91.5
VEECA-5SD10	VEECA-5SD10-000H-0211	2/10/2011	8.20	14,000	0.0	0.0	4.6	9.4	86.0
VEECA-5SD11	VEECA-5SD11-000H-0211	2/10/2011	8.40	21,900	0.0	0.0	14.3	26.2	59.5
VEECA-5SD11	VEECA-5SD11P-000H-0211	2/10/2011	8.40	31,100	NS	NS	NS	NS	NS
VEECA-5SD12	VEECA-5SD12-000H-0211	2/10/2011	8.10	18,400	0.0	6.0	12.7	32.1	49.2
VEECA-5SD13	VEECA-5SD13-000H-0211	2/10/2011	8.20	15,500	0.0	0.0	25.2	31.0	43.8
VEECA-5SD14	VEECA-5SD14-000H-0211	2/10/2011	8.40	11,300	0.0	0.0	7.9	18.9	73.2
VEECA-5SD15	VEECA-5SD15-000H-0211	2/10/2011	8.20	14,100	38.4	5.5	10.3	29.7	16.1
		Average	8.30	15,325	2.6	0.8	8.1	17.5	71.1

mg/kg - milligram per kilogram
SU - standard units
Shading indicates duplicate samples

TABLE 3-3
Animals and Plants Observed at the ECA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Common Name	Scientific Name
Mammals	
Mongoose	*Herpestes auropunctatus*
Birds	
Adelaide's warbler	*Dendroica adelaidae*
American kestrel	*Falco sparverius*
American oystercatcher	*Haematopus ostralegus*
American white pelican	*Pelecanus erythrorhynchos*
Antillean crested hummingbird	*Orthorhyncus cristatus*
Antillean grackle	*Quiscalus niger greater*
Bananaquit	*Coereba flaveola*
Black bellied plover	*Pluvialis squatarola*
Blue-winged teal	*Anas discors*
Brown booby	*Sula leucogaster*
Brown pelican	*Pelecanus occidentalis*
Caribbean elaenia	*Elaenia martinica*
Caribbean martin	*Progne dominicensis*
Gray kingbird	*Tyrannus dominicensis*
Greater yellowlegs	*Tringa melanoleuca*
Killdeer	*Charadrius vociferous*
Lesser yellowlegs	*Tringa flavipes*
Magnificent frigatebird	*Fregata magnificens*
Mangrove cuckoo	*Coccyzus minor*
Northern mockingbird	*Mimus polyglottos*
Osprey	*Pandion haliaetus*
Puerto Rican woodpecker	*Melanerpes portoricensis*
Ruddy turnstone	*Arenaria interpres*
White-cheeked pintail	*Anas bahamensis*
White-tailed tropicbird	*Phaethon lepturus*
Wilson's plover	*Charadrius wilsonia*
Yellow warbler	*Dendroica petechia*
Fish	
none	
Invertebrates	
Saltpan fiddler	*Uca burgersi*
Damselfly larvae	unknown species
Plants (associated with the ECA [inland] Lagoon)	
Red mangrove	*Rhizophora mangle*
Black mangrove	*Avicennia germinans*
Seaside purslane	*Sesuvium portulacastrum*
Widgeon grass	*Ruppia maritima*
Seashore dropseed	*Sporobolus virginicus*
Plants (generally associated with upland habitats[a])	
Espinosa; Prickly bush	*Oplonia spinosa*
none	*Celosia nitida*
Chicharrón; Cock´s spur	*Comocladia dodonaea*

TABLE 3-3
Animals and Plants Observed at the ECA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Common Name	Scientific Name
Bejuco lechoso	*Echites agglutinatus*
Babeiro amarillo	*Pentalinon luteum*
Alhelí; Milk tree	*Plumeria alba*
Cachimbo de leche; Milk bush	*Rauvolfia nitida*
Palma de escoba; Pandereta	*Thrinax morrisii*
none	*Metastelma decipiens*
none	*Baccharis dioica*
Clavelón de playa; Sea ox-eye	*Borrichia arborescens*
Cariaquillo: Bitter bush	*Chromolaena sinuata*
Salaíllo	*Melanthera aspera*
Yerba de San Juan	*Pectis humifusa*
Pancha, San Juan del monte; Tridax	*Tridax procumbens*
Margarita de las rocas	*Wedelia calycina*
Liana fragante	*Distictis lactiflora*
Roble nativo	*Tabebuia heterophylla*
Nigua de playa; Bay lavander	*Argusia gnaphalodes*
Palo de vaca; Pigeon berry	*Bourreria succulenta*
Palo de lija; Sand-paper tree	*Cordia ricksecker*i
Cotorra de playa; Seaside heliotrope	*Heliotropium curassavicum*
Nigüita	*Tournefortia microphylla*
Mostacilla; Sea-rocket	*Cakile lanceolata*
Nido de gungulén; Bunch moss	*Tillandsia recurvata*
Almácigo	*Bursera simaruba*
Melón de costa; Turk´s cap	*Melocactus intortus*
Higo de mar; Prickly pear	*Opuntia dillenii*
Dildo; Organ pipe	*Pilosocereus royenii*
Barbasco; Canelle	*Canella winteriana*
Bejuco inglés; Black wattle	*Capparis cynophallophora*
Palinguán; Caper tree	*Capparis flexuosa*
Sapo prieto; Linguam	*Capparis indica*
Coscorrón; Marble-tree	*Cassine xylocarpa*
Coral; Poison cherry	*Crossopetalum rhacoma*
Araña; False boxwood	*Gyminda latifolia*
Alfilerillo; Bois flamant	*Maytenus laevigata*
Cafeíllo; Florida boxwood	*Schaefferia frutescens*
Guayabacoa, Palo de cruz	*Garcinia portoricensis*
Úcar	*Bucida buceras*
Mangle botón; Botton tree	*Conocarpus erecta*
Cohitre; Blue day flower	*Commelina diffusa*
Bejuco de Mona; Dodder	*Cuscuta americana*
none	*Evolvulus convolvuloides*
none	*Evolvulus sericeus*
Bejuco playero; Bay hops	*Ipomoea pes–caprae*
Bejuquillo guitarra; Guitar-vine	*Ipomoea steudelii*
Bejuco de luna; Coast moon-vine	*Ipomoea violacea*

TABLE 3-3
Animals and Plants Observed at the ECA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Common Name	Scientific Name
Aguinaldo de costa	*Jacquemontia havanensis*
Aguinaldo azul	*Jacquemontia pentanthos*
Batatilla blanca	*Merremia quinquefolia*
none	*Bulbostylis pauciflora*
none	*Cyperus sp.*
none	*Scleria lithosperma*
Escambrón	*Adelia ricinella*
Plateada	*Argythamnia candicans*
Lechoso; Little red devil, Bush spurge	*Chamaesyce articulata*
Lecherito de costa	*Chamaesyce messembryanthemifolia*
Lecherita	*Chamaesyce turpinii*
Maná	*Croton astroites*
none	*Croton betulinus*
Lechecillo	*Croton discolor*
Indio desnudo; Manchineel berry	*Euphorbia petiolaris*
Yaití; Ramón; Crabwood	*Gymnanthes lucida*
Manzanillo; Manchineel	*Hippomane mancinella*
Higuereta cimarrona	*Jatropha gossypiifolia*
Yerba Rosario	*Aeschynomene americana*
Bosborin; Ink berry	*Scaevola plumieri*
Bejuco dorado; Love vine	*Cassytha filiformis*
Haba de San Antonio; Gray nickers	*Caesalpinia bonduc*
Mato amarillo; Yellow nickers	*Caesalpinia ciliata*
Mato de Culebra	*Caesalpinia culebrae*
none	*Chamaecrista portoricensis*
Canavalia; Bay-bean	*Canavalia rosea*
Conchita de Virginia	*Centrosema virginianum*
Maraimaray	*Dalbergia ecastaphyllum*
Frijolillo de monte	*Rhynchosia reticulata*
Zarzabacoa enana; Pencil flower	*Stylosanthes hamata*
Añil cenizo	*Tephrosia cinerea*
Frijolillo	*Teramnus labialis*
Casia; Twisted acacia	*Acacia tortuosa*
Acacia pálida; Wild tamarind	*Leucaena leucocephala*
Zarza; Black amaret	*Mimosa ceratonia*
Escambrón colorado; Black bean	*Pithecellobium unguis-cati*
Mesquite	*Prosopis juliflora*
Bejuco de San Pedro	*Stigmaphyllon emarginatum*
Aceituna; Candle berry	*Byrsonima lucida*
Algodón; Wild cotton	*Gossypium barbadense*
Emajagüilla; Cork tree	*Thespesia populnea*
Jagüeillo; Boislaglu	*Ficus citrifolia*
Grajo; Krum-berry	*Eugenia axillaris*
Hoja menuda; Black rod-wood	*Eugenia biflora*
Anhuila; Spanish stopper	*Eugenia foetida*

TABLE 3-3
Animals and Plants Observed at the ECA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Common Name	Scientific Name
Birijí; Black cherry	*Eugenia monticola*
Corcho blanco; Water mampoo	*Pisonia subcordata*
Araña	*Schoepfia obovata*
Ciruelo de la Florida; Florida plum	*Ximenia americana*
Florida privet, Ink-bush	*Forestiera segregata*
Cañuela de costa: Mac Connell's orchid	*Psychilis macconnelliae*
Flor de pasión	*Passiflora suberosa*
Carmín; Cat´s blood	*Rivina humilis*
Huracán; Hurricane grass	*Bothriochloa pertusa*
Abrojo; Bur grass	*Cenchrus echinatus*
Horquetilla morada; Blue grass	*Chloris inflata*
Yerba de dedo; Finger grass	*Chloris petraea*
Grama de costa; Plush-grass	*Chloris radiata*
Matojo de arena	*Paspalum laxum*
Yerba de sal; Salt grass	*Spartina patens*
Pelo de burro	*Sporobolus jacquemontii*
Lágrima de San Pedro	*Uniola virgata*
Uverita playera	*Coccoloba krugii*
none	*Coccoloba krugii x C. uvifera*
Uverillo	*Coccoloba microstachya*
Uva de playa; Sea grape	*Coccoloba uvifera*
Abeyuelo, Sanguinaria; Greenheart	*Colubrina arborescens*
Catire; Naked wood	*Colubrina elliptica*
Bariaco; Black iron-wood	*Krugiodendron ferreum*
Cascarroya	*Reynosia uncinata*
Azufaifo, Cascarilla	*Ziziphus reticulata*
Boje, Quina	*Antirhea acutata*
none	*Catesbaea parviflora*
Jayajabico; Black torch	*Erithalis fruticosa*
none	*Ernodea littoralis*
Albarillo; Prince-wood	*Exostema caribaeum*
Cucubano liso; Velvet seed	*Guettarda elliptica*
Gardenia hedionda; Indian mulberry	*Morinda citrifolia*
Tintillo; Ink-berry	*Randia aculeata*
Lirio	*Strumpfia maritima*
Cuabilla	*Amyris elemifera*
Aceitillo; Yellow sander	*Zanthoxylum flavum*
Quenepa; Ginep	*Melicoccus bijugatus*
Alquitrán; Break hill	*Sideroxylon obovatum*
Té del país; Goat weed	*Capraria biflora*
Berenjena de playa; Rubia	*Solanum persicifolium*
Cuernecillo; Cowbush	*Helicteres jamaicensis*
Bretónica prieta	*Melochia nodiflora*
Bretónica piramidal	*Melochia pyramidata*
Bretónica afelpada	*Melochia tomentosa*

TABLE 3-3
Animals and Plants Observed at the ECA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Common Name	Scientific Name
Basora prieta, Malvavisco	*Waltheria indica*
Azúcares	*Jacquinia arborea*
Mercocha	*Jaquinia berterii*
Malvaté	*Corchorus hirsutus*
Escoba blanca	*Corchorus siliquosus*
Damiana	*Turnera diffusa*
Palo de guitarra; Old woman bitter	*Citharexylum fruticosum*
Botón de oro; Crab prickly	*Clerodendron aculeatum*
Santa María; Button sage	*Lantana involucrata*
Bretónica	*Stachytarpheta jamaicensis*
Bretónica de costa	*Stachytarpheta strigosa*
Caro costero	*Cissus trifoliata*
Guayacán; Lignum vitae	*Guaiacum officinale*

a - Source: Geo-Marine (2007)

TABLE 3-4
Federally Listed Species Occurring or Potentially Occurring at NASD Vieques
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Scientific Name (Common Name)	Federal Status
Plants	
Chaemacrista glandulosa var. mirabilis (Herb)	Endangered
Stahlia monosperma (Cobana negra)	Threatened
Calyptranthes thomasiana (Thomas' lidflower)	Endangered
Eugenia woodburyana (Evergreen tree)	Endangered
Goetzea elegans	Endangered
Reptiles and Amphibians	
Chelonia mydas (Green sea turtle)	Threatened
Dermochelys coriacea (Leatherback sea turtle)	Endangered
Eretmochelys imbricata (Hawksbill sea turtle)	Endangered
Caretta caretta (Loggerhead sea turtle)	Threatened
Birds	
Sterna dougalli dougalli (Roseate tern)	Threatened
Mammals	
Physeter macrocephalus (Sperm whale)	Endangered
Megaptera novaeangliae (Humpback whale)	Endangered
Trichechus manatus (West Indian manatee)	Endangered

Source: Vieques Integrated Natural Resource Plan, Plan Years 2003 - 2012 (Geo-Marine 2003)

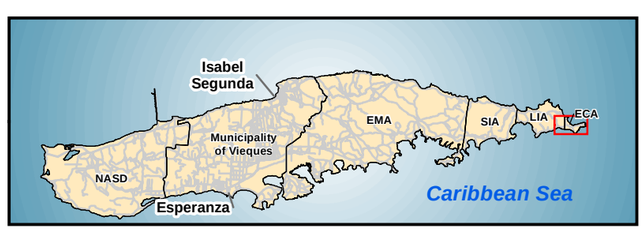
(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 3-1 ECA Topographic Map.mxd8/15/2011

Legend

Topographic Contour (10 foot interval)

ECA Boundary

Notes:
Topographic Contours derived from LIDAR.
Topographic Contour elevations are feet above sea level at time of LIDAR survey.



N
W E
S

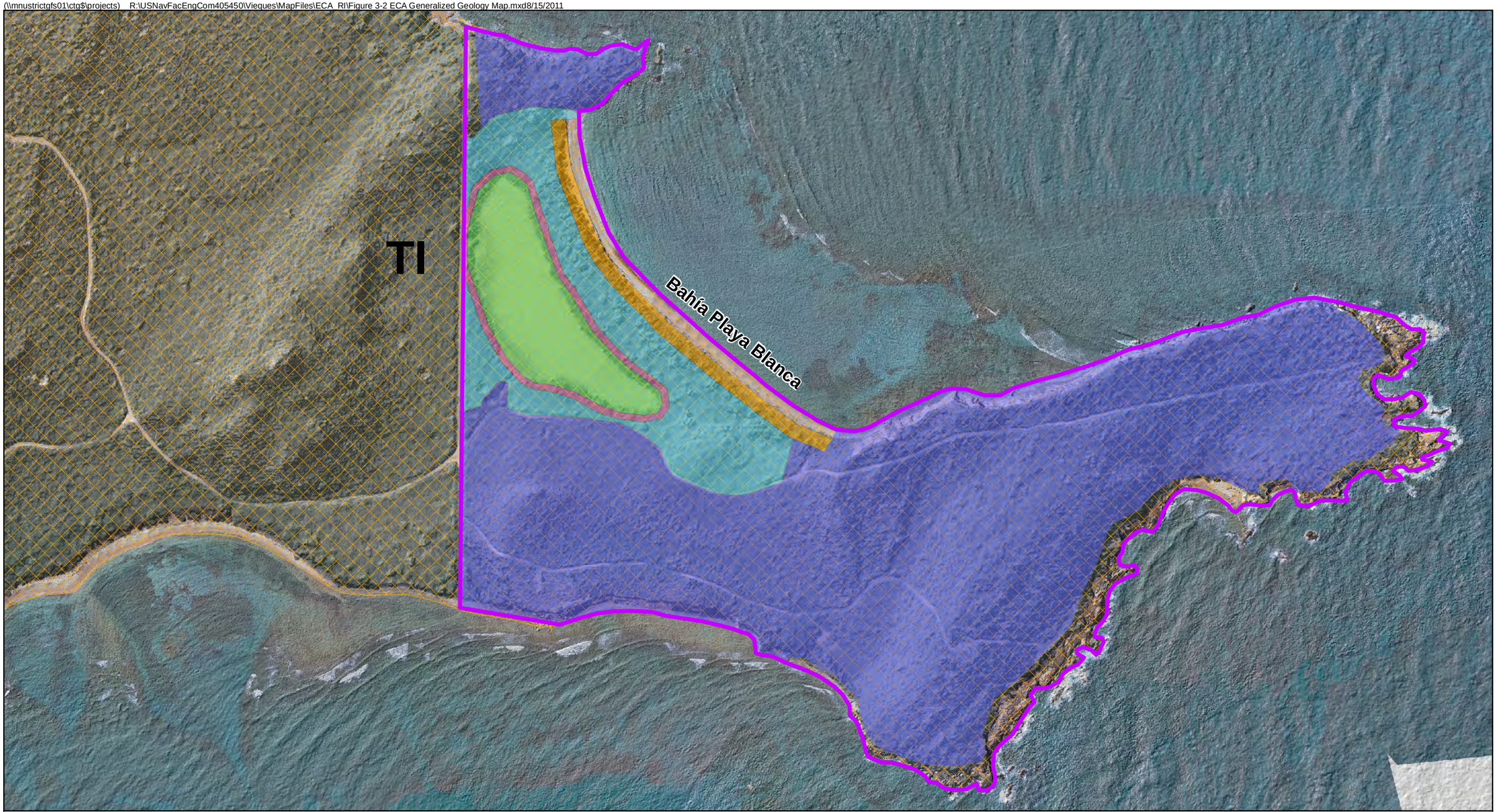
0 500 1,000 Feet

2007 Aerial Image

Figure 3-1
ECA Topographic Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 3-2 ECA Generalized Geology Map.mxd8/15/2011



Legend

ECA Boundary

Geology

TI - Marine Sedimentary Rocks, Undivided

Decision Unit Boundary

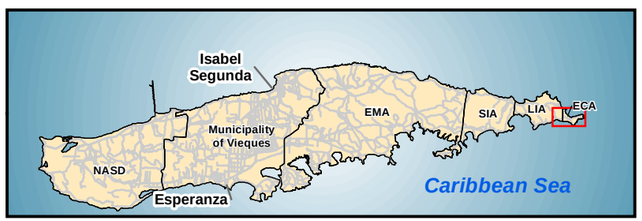
Beach

Upland

Lowland

Lagoon

Lagoon Fringe



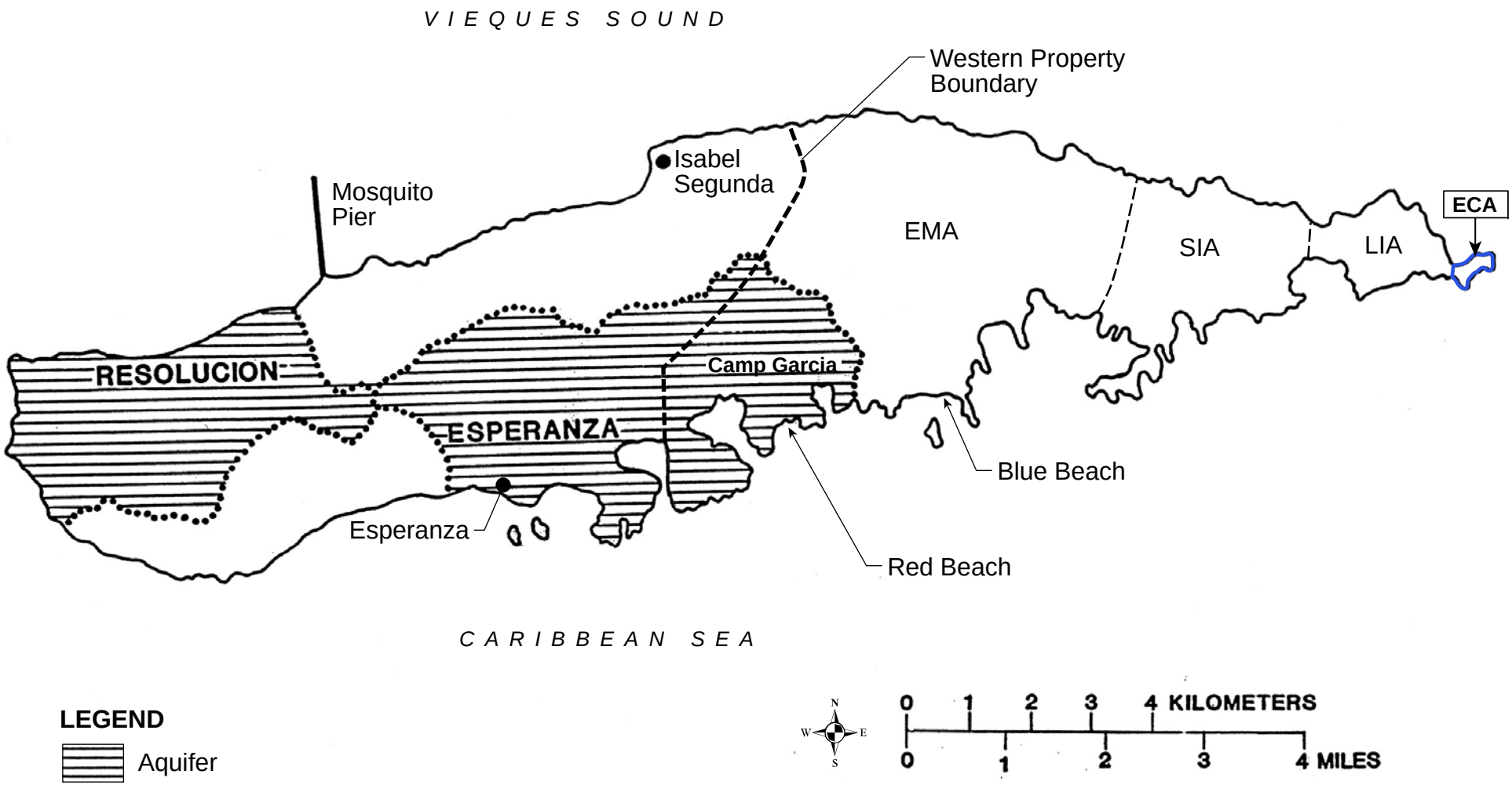
N
W E
S

0 500 1,000 Feet

2007 Aerial Image

Figure 3-2
ECA Generalized Geology Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



LEGEND

Aquifer

(Reference: Torres - Gonzalez, 1989)

FIGURE 3-3
Resolución and Esperanza Aquifers
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

SECTION 4

Nature and Extent of Contamination

This section presents an evaluation of the nature and extent of MEC and environmental media contamination at UXO 1. The MEC investigation included surface removal across UXO 1, a geophysical survey of roads and beaches to identify the locations of buried metallic items that may be indicative of MEC, and subsurface removal along roads and beaches. The collective information garnered from these activities characterized the nature and extent of MEC and other munitions-related material present. The environmental investigation focused on areas within UXO 1 that were representative of potentially affected media, potential exposure pathways, and the greatest potential for contamination.

4.1 Nature and Extent of Munitions and Explosives of Concern and other Munitions-related Material

Through the TCRA and NTCRA activities:

- Approximately 125 acres of UXO 1 were subject to surface removal of MEC, MD, RRD, and cultural debris during the TCRA
- Approximately 16 acres of sandy beaches and roads (including 25 foot buffers on each side of the roads) within UXO 1 were subject to subsurface removal of MEC, MD, RRD, and cultural debris. Removal on the beaches was performed to a depth of 4 feet bgs or until water was encountered. Removal on roads (and buffers) was performed to a depth of 2 feet bgs or until bedrock was encountered.

UXO 1 was not designated as a target area for ATG bombing and naval gunfire, but was located adjacent to the LIA. MEC and other munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA. Therefore, MEC and other munitions-related material densities identified were much lower in UXO 1 than in the adjacent UXO sites that make up the beaches, roads, and interior of the former LIA (UXOs 2, 3, and 4, respectively).

The types and distribution of surface MEC removed from UXO 1 during the TCRA are presented in **Table 4-1** and shown in **Figure 4-1.** The types of MEC/MD encountered in the EC A and their constituents are presented in **Table 4-2**. A total of 1,308 MEC were removed from the ground surface. Although the density of material varied throughout UXO 1, the overall density averaged 10 surface MEC per acre, transitioning from about 4.5 surface MEC per acre within the eastern portion of the site to about 16 surface MEC per acre within the western portion of the site near the LIA. In addition, 784 MD and 10,487 RRD were removed from the ground surface during the TCRA with a density and distribution similar to the MEC.

The types and distribution of subsurface MEC removed from UXO 1 during the NTCRA are presented in **Table 4-1** and shown in **Figure 4-2.** The general density and distribution of subsurface MEC are consistent with those observed for the surface MEC, with the density highest in the vicinity of the LIA. A total of 1,177 discrete anomalies and 6 anomaly polygons were investigated during the NTCRA; a total of 3,539 metallic items were found within those anomalies. A total of 97 MEC (approximately 3 percent of the total number of metallic items identified) were found from 91 of the anomalies (discrete and polygon) identified by DGM. Due to the presence of bedrock near the ground surface, a majority of the MEC (78 in total) were found within the first 18 inches of excavation. A total of 792 MD were recovered from 333 anomaly locations, and 2,650 RRD were recovered from 1,076 anomaly locations. The distribution and depth intervals were consistent with the MEC identified.

There has been no discernable difference in the types of MEC recovered across the TCRA and NTCRA areas. Over 80 percent of the MEC recovered from UXO 1 were projectiles/mortars. The MEC most commonly found were 20mm rounds, which accounted for over 60 percent (809 in total) of the MEC found on the surface and over 50 percent (51 in total) recovered from the subsurface.

The overall density of subsurface MEC recovered at UXO 1 during the NTCRA was approximately 6 MEC per acre. Given that 16 of the 133 acres within UXO 1 were subsurface cleared of MEC, if the 6 MEC per acre average is consistent across the site, there are approximately 708 subsurface MEC items remaining at the site.

4.2 Nature and Extent of Environmental Media Contamination

This subsection discusses the nature and extent of environmental media contamination based on the summary of analytical results from the RI. The following samples were collected to provide sufficient coverage of the environmental media at the site to assess the nature and extent of contamination:

- 48 incremental soil samples (0-2 inches bgs), including triplicates, from the Upland, Lowland, Beach, and Lagoon Fringe decision units
- 2 discrete surface soil samples (0-1 foot bgs), including a duplicate, from the former battery disposal area within the Upland decision unit
- 9 discrete deeper surface soil samples, including duplicates, from the Beach (18 to 24 inches bgs), Lagoon Fringe, and Upland (2.5 to 24 inches bgs) decision units
- 17 discrete subsurface soil samples (2 foot interval above bedrock or groundwater, whichever was shallower) from the Lowland decision unit
- 6 surface water and 17 sediment samples, including duplicates, from the ECA Lagoon

In addition to the above, 10 background incremental soil samples (**Figure 2-5**) were collected from the same lithologic unit as present at UXO 1. **Table 4-3** presents the background incremental soil sample results. Constituent concentrations detected in environmental media at UXO 1 are summarized in **Tables 4-4 through 4-7**, and exceedances are shown spatially in **Figures 4-3 through 4-7**. Laboratory analytical reports from the RI are included in **Appendix J**.

4.2.1 Soil

Tables 4-4 and 4-5 present the explosives and inorganics that were observed in surface, deeper surface, and/or subsurface soil at UXO 1 and identify the constituents that exceeded screening criteria. Exceedances are shown in **Figures 4-3 through 4-5**. The nature and extent of these constituents are discussed below.

Explosives

Only one explosive compound (nitrobenzene) was detected in surface soil above a screening criterion (SSL of 28 µg/kg), with a concentration of 98 NJ µg/kg. However, the detected concentration is between about two and three orders of magnitude below the risk-based screening criteria. This sample (4DU03) was collected along the boundary with the LIA (**Table 4-4 and Figure 4-3**). Other detected explosives, but at concentrations below screening criteria within surface soil, include 1,3,5-trinitrobenzene (one detection), 2,4,6-trinitrotoluene (one detection), 3,5-dinitroanaline (one detection), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (one detection), tetryl (one detection), and perchlorate (twelve detections). In all cases, the detected concentrations of the explosives are between about an order of magnitude and more than five orders of magnitude below all screening criteria. The explosives 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, HMX, and perchlorate were also detected in close proximity to where subsurface MEC was identified during the NTCRA.

No explosives were detected in subsurface soil.

The information above suggests explosives contamination in soil at the ECA is negligible. This is further emphasized by the fact that the incremental and discrete soil samples represented approximately 900 analyses, in which there were only 16 detections, all but one of which are orders of magnitude below screening criteria.

Inorganic Constituents

Inorganic constituents (also referred to as “metals”) detected at UXO 1 may be either site-related (i.e., associated with historic activities) or non-site related (i.e., background). To distinguish site-related inorganic concentrations from background, incremental soil sample results were compared against the background incremental sample results

collected as part of this RI (**Table 4-3 and Appendix M**) and discrete soil sample results were compared to the discrete soil sample results from the Tl lithologic unit, as presented in the East Vieques Background Study (CH2M HILL, 2007a), in accordance with the UXO 1 SAP (CH2M HILL, 2011a). Discrete background samples were collected from the top 6 inches (surface soil) and from 6 inches to a maximum depth of 2 feet (subsurface soil), based on the depth to bedrock. Statistical analysis of this dataset indicated that, with the exception of cyanide, lead, and sodium, the surface and subsurface soil inorganics concentrations are statistically comparable. Cyanide was not detected in the UXO 1 discrete soil samples and none of the discrete soil lead concentrations exceeded screening values, regardless of depth. Therefore, the background subsurface soil dataset is appropriate for use in comparison to discrete subsurface soil data collected within UXO 1, regardless of depth.

Site-Wide (excluding battery disposal area)

Arsenic, cobalt, hexavalent chromium, and selenium were detected above background concentrations and at least one screening criterion within surface and/or subsurface soil.

- Arsenic exceeded background concentrations (8.5 mg/kg [surface soil] and 9.2 mg/kg [subsurface soil]) and screening criteria (adjusted RSL for industrial soil [1.6 mg/kg], ESV [18 mg/kg], and SSL [3.1 mg/kg]) variously in 27 of the 74 surface and subsurface soil samples (including duplicates), with a maximum concentration of 71.8J mg/kg within subsurface soil (2 to 4 feet bgs) located near the LIA boundary (2SB08). However, review of **Figures 4-4 and 4-5** show that the arsenic concentrations are relatively consistent across the site, with no discernible pattern of higher concentrations closer to the LIA. Further, a review of **Figures 4-3 and 4-4** show there is no discernible pattern of arsenic concentrations associated with samples where explosives were detected. Arsenic may be associated with munitions; however, it is reportedly used in minute quantities. Based on the above information, arsenic at the site is not likely associated with a release, but is instead attributable to localized background concentrations associated with the limestone bedrock. For example, in sampling of limestone spanning from Georgia into Florida, investigators found geogenic arsenic (naturally occurring in the aquifer matrix) was present in heterogeneous concentrations within the limestone, primarily in framboidal pyrites (microscopic aggregates of pyrite) in the limestone matrix. Arsenic concentrations in the rock ranged from 0.1 mg/kg to 69 mg/kg (Pilcher et al., 2011). Further, the presence of arsenic may be from being adsorbed to metal oxides and clay-mineral surface within weathered soil, or associated with organic carbon (Welch et al., 1988).
- Cobalt slightly exceeded the background concentrations (11.2 mg/kg [surface soil] and 15.8 mg/kg [subsurface soil]) and SSL (5 mg/kg) in only 3 of the 74 samples, with a maximum concentration of 12.5 mg/kg in surface soil and 19.4 mg/kg in subsurface soil. In fact, only one subsurface soil sample contained cobalt above the SSL, which suggests there is no concern regarding leaching of cobalt to groundwater on a site-wide basis. Because the cobalt concentrations are below or very close to the background concentrations, coupled with the fact that cobalt is not commonly used in munitions, it is likely naturally occurring at UXO 1.
- Hexavalent chromium exceeded the SSL (0.0061 mg/kg) in only 2 of the 74 samples collected, with concentrations of 0.067J and 0.013J mg/kg located in subsurface soil samples collected adjacent to the LIA boundary (2SB07 and 2SB09). Chromium may be associated with munitions, but is reportedly used in minute quantities. Additionally, hexavalent chromium was detected in one background incremental sample, at a concentration (0.056 mg/kg) similar to that observed in the two discrete soil samples collected at the ECA. Further, no explosives were detected in the two samples in which hexavalent chromium was detected. The above information suggests that hexavalent chromium is likely attributable to background and not a leaching concern for groundwater.
- Selenium exceeded the background concentration (1.3 mg/kg for both surface and subsurface soil) and ecological screening criterion (0.5 mg/kg) in 12 of the 74 samples, with a maximum concentration of 1.9 mg/kg in the upland (4DU10) in surface soil, and 1.9 mg/kg in the lowland (2DU05) subsurface soil sample. Selenium may be associated with munitions, but it is reportedly used in minute quantities. Further, selenium was detected up to 2.4J mg/kg as part of the background incremental sampling; although that concentration was identified as an outlier, it is likely representative of background [see **Table 2** of **Appendix M**]). The above information suggests selenium occurrence is believed to be naturally occurring related to its association with iron oxides since all of the selenium detections were similar to background.

The inorganics data, especially when considered with the explosives data, show there is no widespread contamination at the site. This is demonstrated by relatively few instances of metals detected above background, the relatively few numbers of exceedances of those metals, and the relatively low magnitude of those exceedances. In fact, the data suggest that the metals concentrations at the site, regardless of their relationship to screening criteria are wholly or primarily attributable to background. Therefore, potential leaching of inorganic contaminants to groundwater on a site-wide basis is insignificant.

Battery Disposal Area

One discrete shallow soil sample was collected to sufficiently characterize the battery disposal area, due to its small size (approximately one square foot in area) and different potential source of contamination than the rest of the site. As specified in the SAP, the results of this soil sample would be compared to the adjusted RSLs and background, and if the soil concentrations associated from the battery disposal area exceeded the RSLs and background, the soil in that area would be removed rather than evaluating in a quantitative risk assessment. However, since the soil concentrations detected from this soil sample were similar to site wide soil concentrations and likely attributable to background, the sample was included in the quantitative human health risk assessment, as discussed in Section 7. Detected concentrations from the battery disposal area above background and screening criteria are discussed below.

Arsenic, hexavalent chromium, iron, and selenium were detected above background concentrations and at least one screening criterion within the discrete surface soil sample collected at the battery disposal area (4SS01).

- Arsenic exceeded the background concentrations (8.5 mg/kg [surface soil] and 9.2 mg/kg [subsurface soil]) and screening criteria (adjusted RSL for industrial soil [8.5 mg/kg], ESV [18 mg/kg], and SSL [3.1 mg/kg]) with a concentration of 23.8J mg/kg. Arsenic may be associated with batteries; however, the detected concentration is comparable to the arsenic concentrations detected throughout UXO 1 (see the arsenic discussion under the site-wide soil discussion above).
- Hexavalent chromium exceeded only the SSL of 0.0061 mg/kg with a concentration of 0.067J mg/kg. Hexavalent chromium may be associated with batteries. However, as discussed above, hexavalent chromium at this level is likely attributable to background and not a leaching concern for groundwater.
- Iron slightly exceeded the background concentration of 38,100 mg/kg and SSL of 6,600 mg/kg; however, the single exceedance, at a concentration of 38,300 mg/kg, is likely naturally occurring due to its similarity with the background concentration and absence of elevated iron concentrations across the site.
- Selenium slightly exceeded the background concentration of 1.3 mg/kg and the ecological screening criterion of 0.52 mg/kg, with a concentration of 2.7 mg/kg. The selenium occurrence is believed to be naturally occurring related to its association with iron oxides, considering the other detected concentrations of selenium throughout UXO 1, as discussed above.

Lead is considered to be the primary chemical of potential concern associated with the battery disposal area. Lead was detected at concentrations below the screening criteria.

4.2.2 Surface Water and Sediment

Surface water and sediment samples were collected from the ECA Lagoon to determine if any impacts associated with direct contact or transport and deposition by overland flow were present.

Tables 4-6 and 4-7 summarize the explosives and inorganics results for surface water and sediment, respectively, at the ECA Lagoon. **Figures 4-6 and 4-7** present the exceedances in surface water and sediment. The nature and extent of constituents in surface water and sediment are discussed below.

Explosives

No explosives were detected in surface water or sediment at the ECA Lagoon.

Inorganic Constituents

No background data are available for the surface water and sediment inorganic constituents from the ECA Lagoon. To determine potential impacts from past Navy activities, a multiple line of evidence approach was used, as outlined in the ECA RI SAP (CH2M HILL, 2011a). Soil within UXO 1 is derived from the limestone and dolomite bedrock that comprise the entire site upgradient, immediately adjacent to, and underlying the lagoon. Sediment within the lagoon consists of soil transported from the adjacent area. This is the same type of lithology from which the soils within the background area were derived.

Inorganics detected above screening criteria within surface water and/or sediment of the ECA Lagoon include aluminum (sediment), arsenic (surface water and sediment), barium (sediment), chromium (surface water and sediment), cobalt (surface water), copper (surface water), iron (surface water), manganese (sediment), selenium (surface water and sediment), thallium (surface water), and vanadium (sediment). Each detected inorganic constituent above screening criteria is discussed below.

- Aluminum exceeded the ecological screening value (18,000 mg/kg) in sediment at two locations (5SD05 and 5SD09), with a maximum concentration of 20,000 mg/kg. The aluminum concentrations detected in the ECA lagoon sediment are likely attributable to background because the concentrations detected in sediment (approximately 7,000 mg/kg to 20,000 mg/kg) are within the range of aluminum concentrations detected in UXO 1 surface soil (about 500 mg/kg to 37,000 mg/kg), which are comparable to both the discrete soil aluminum background value (35,000 mg/kg) and the incremental soil aluminum background value (58,200 mg/kg).
- Total and/or dissolved arsenic concentrations exceed a screening criterion (RSL for tap water of 0.045 μg/L) at each surface water sample, with a maximum concentration of 2J μg/L (5SW01). The arsenic concentrations in twelve sediment samples exceeded the RSL for industrial soil (1.6 mg/kg), with a maximum concentration of 3.3J mg/kg (5SD01). However, the arsenic concentrations observed in sediment (less than 1 mg/kg to about 3 mg/kg) are at the low end of the concentration range observed in surface soil at the site (less than 1 mg/kg to about 36 mg/kg), indicating that arsenic within the ECA Lagoon is most likely attributable to background, as were the soil arsenic concentrations under the Soil discussion above.
- Barium was similar to the ecological screening value (48 mg/kg) in sediment at one location (5SD14), at a concentration of 48.4 mg/kg. Additionally, the barium concentration range in sediment (approximately 16 mg/kg to 48 mg/kg) is similar to the majority of surface soil concentrations observed at the site (approximately 7 mg/kg to 50 mg/kg), all of which are below the discrete soil background level (212 mg/kg) and the incremental soil background level (120 mg/kg). Therefore, barium in the ECA lagoon sediment is likely attributable to background.
- Total chromium exceeded the RSL for tap water of 0.043 μg/L in all of the surface water samples, with a maximum concentration of 7.5 μg/L (5SW03). However, dissolved chromium concentrations did not exceed screening criteria. The totals concentrations may have been elevated due to suspended solids. Total chromium exceeded the adjusted RSL industrial soil value (5.6 mg/kg) in all sediment samples, with a maximum concentration of 35.5 mg/kg (5SD05). However, the chromium concentrations detected in the ECA lagoon (approximately 18 mg/kg to 35 mg/kg) are within the range of chromium concentrations detected in UXO 1 surface soil (about 6 mg/kg to 66 mg/kg), which are comparable to both the discrete soil chromium background value (70 mg/kg) and the incremental soil chromium background value (79 mg/kg). Therefore, chromium in the ECA lagoon is likely attributable to background.
- Cobalt exceeded the adjusted RSL for tap water of 1.1 μg/L in all surface water samples, with a maximum concentration of 3.1 μg/L (5SW01). It is noted that the cobalt concentrations observed in the ECA lagoon sediment (approximately 4 mg/kg to 8 mg/kg) are within the concentration range observed in UXO 1 surface soil (less than 1 mg/kg to about 13 mg/kg), all of which are below or comparable to both the discrete soil cobalt background value (16 mg/kg) and the incremental soil cobalt background value (11 mg/kg). Therefore, the cobalt in the lagoon (both in the surface water and sediment) is likely attributable to background, as are the cobalt concentrations in soil (see cobalt discussion under the Soil subsection above).

- Copper exceeded the ecological screening criterion of 3.73 μg/L in all surface water samples, with a maximum concentration of 12.1 μg/L (5SW04). Copper concentrations were uniform across the lagoon ranging from 11.2 to 12.1 μg/L (total) and 9.9 to 10.5 μg/L (dissolved). It is noted that the copper concentrations observed in the ECA lagoon sediment (approximately 9 mg/kg to 26 mg/kg) are comparable to the concentration range observed in UXO 1 surface soil (less than 1 mg/kg to about 25 mg/kg) and below or comparable to both the discrete soil copper background value (94 mg/kg) and the incremental soil copper background value (25 mg/kg). This information, together with the relative uniformity of copper concentrations in surface water across the lagoon, indicates the copper in the lagoon (both in the surface water and sediment) is likely attributable to background.
- Iron exceeded the ecological screening criterion for surface water (50 μg/L) in all five surface water samples, with a maximum concentration of 2,530 μg/L (5SW03). Similar to copper, iron concentrations were uniform across the lagoon. Additionally, iron concentrations observed in the ECA lagoon sediment (approximately 8,000 mg/kg to 18,000 mg/kg) are within the concentration range observed in UXO 1 surface soil (less than 1,000 mg/kg to about 38,000 mg/kg) and below or comparable to both the discrete soil iron background value (38,000 mg/kg) and the incremental soil iron background value (49,000 mg/kg). This information indicates the iron in the lagoon (both in the surface water and sediment) is likely attributable to background.
- Manganese concentrations exceeded the ecological screening level (260 mg/kg) in all sediment samples, with a maximum concentration of 571 mg/kg (5SD05). However, the manganese concentration range in sediment (274 mg/kg to 571 mg/kg) is within the range of surface soil concentrations observed at the site (26 mg/kg to 838 mg/kg), all of which are below the discrete soil background level (1,630 mg/kg) and the incremental soil background level (1,040 mg/kg). Therefore, manganese in the ECA lagoon sediment is likely attributable to background.
- Dissolved selenium exceeded the RSL for tap water of 18 μg/L in three of the surface water samples, with a maximum concentration of 27 μg/L (5SW01). Selenium exceeded the ecological screening criteria (1 mg/kg) in sediment at 13 of the 17 samples, with a maximum concentration of 2.7 mg/kg (5SD05). As discussed in Section 4.2.1, selenium is likely naturally occurring at the site. It is noted that the selenium concentrations observed in the ECA lagoon sediment (approximately 1 mg/kg to 3 mg/kg) are comparable to the concentration range observed in UXO 1 surface soil (less than 1 mg/kg to about 3 mg/kg).
- Total thallium exceeded the RSL for tap water of 0.037 μg/L in two of the surface water samples, with a maximum concentration of 0.7J μg/L (5SW04). However, the thallium concentration detected in the ECA lagoon sediment (0.081 mg/kg) is comparable to the concentrations detected in UXO 1 surface soil (three detects between 0.077 mg/kg and 0.27 mg/kg) and less than the discrete soil thallium background concentration (0.13 mg/kg). Additionally, thallium is not usually associated with munitions. Therefore, thallium in ECA lagoon surface water is likely naturally occurring.
- Vanadium exceeded the ecological screening criteria (57 mg/kg) in only one sediment sample (5SD15), at a concentration of 62.3 mg/kg. However, the vanadium concentration range in sediment (approximately 27 mg/kg to 62 mg/kg) is within the range of surface soil concentrations observed at the site (approximately 4 mg/kg to 71 mg/kg), all of which are below or comparable to the discrete soil background level (56 mg/kg) and the incremental soil background level (72 mg/kg). In addition, vanadium is not a metal commonly associated with munitions. Therefore, vanadium in the ECA lagoon is likely attributable to background.

TABLE 4-1
UXO Items Recovered from UXO 1
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Item Class	Number of Surface Items Removed During TCRA	Number of Subsurface Items Removed During NTCRA
Bombs	23	15
Flares-Pyrotechnics	17	2
Grenades	0	0
MEC Component	45	2
Projectiles / Mortars	1,087	67
Rockets / Guided Missiles	130	11
Sub munitions	6	0
Total	1,308	97

TABLE 4-2
MEC/MD Items Encountered in the ECA and Their Constituents
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Item	Primary Metal	Secondary Metal	Possible Additional Metal Constituent	Likely Filler
20MM HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	TETRYL MAIN CHARGE
25MM HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	RDX
30MM HE PROJECTILES	STEEL (IRON)	COPPER ROTATING BAND		RDX
155MM HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	TNT OR COMPOSITION B
5 INCH HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	EXPLOSIVE D OR COMPOSITION A3
5 INCH PUFF PROJECTIES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	TETRYL AND TITANIUM TETRACHLORIDE
75MM HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	TNT OR COMPOSITION B
37MM HE PROJECTILES	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	TNT
105 MM ILUMINATION PROJECTILE	STEEL PROJ. BODY (IRON)	COPPER ROTATING BAND	POSSIBLE GUILDING METAL ROTATING BAND (90%COPPER 10 % ZINC)	ILLUMINATING COMPOUND
MK 82 500 LB BOMB	STEEL			TRITONAL OR H6
BDU 33 PRACTICE BOMBS	CAST IRON			RED PHOSPHORUS
2.75 INCH HE ROCKET WARHEAD	STEEL			COMPOSITION B
2.75 INCH ROCKET MOTOR	ALUMINUM			DOUBLE BASE BALLISITE (NITROCELLULOSE AND NITROGLYCERINE) PROPELLANT
	STEEL (IRON)			BLACK POWDER (potassium nitrate, charcoal, sulfur)
				MAGNESIUM
MK 23 IGNITER	STEEL			TETRYL
				WHITE PHOSPHORUS
MK 118 SUB MUNITIONS	STEEL			COMPOSITION B
MK24/45 AIRCRAFT FLARE	ALLUMINUM			ILLUMINATING COMPOUND
MK 25 MARINE MARKER	ALUMINUM			Pyrotechnic Composition

TABLE 4-3
Incremental Background Sample Results
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	VEECA-6DU01	VEECA-6DU02			VEECA-6DU03
Sample ID	VEECA-6SMI01-0211	VEECA-6SMI02-0211	VEECA-6SMI02T-0211	VEECA-6SMI02TT-0211	VEECA-6SMI03-0211
Sample Date	02/16/11	02/16/11	02/16/11	02/16/11	02/16/11
Chemical Name					
Total Metals (MG/KG)					
Aluminum	30,300	27,800	30,100	28,700	42,900
Arsenic	3.9	4.8	5.3	5	6.1
Barium	74.4	65.4	71.9	70.2	97.6
Beryllium	0.73 J	0.66 J	0.74 J	0.71 J	1.1 J
Cadmium	0.3 J	0.23 J	0.25 J	0.25 J	0.28 J
Calcium	23,500	32,900	32,900	37,300	14,400
Chromium	42.4 J	40 J	44.2 J	42 J	59.3 J
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	6.6	5.9	6.4	6.2	8.4
Copper	16.3	16	17.3	17.6	21.7
Iron	25,900	23,900	26,300	25,100	37,200
Lead	10.1	7.6	9.5	8.8	11.9
Magnesium	4,800	4,630	4,580	4,760	5,130
Manganese	763	552	580	588	851
Nickel	13	11.7	12.5	12.1	18.2
Potassium	6,530 J	6,090 J	6,360 J	6,320 J	7,870 J
Selenium	2.1 J	2 U	2 U	2 U	1.1 J
Sodium	242 J	233 J	227 J	246 J	254 J
Thallium	0.5 U	0.5 U	0.5 U	0.5 U	0.26 J
Vanadium	42.4	38.4	41.5	40.1	59.4
Zinc	27.2	23.6	24.3	24.1	39.2

Notes:
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram

TABLE 4-3
Incremental Background Sample Results
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	VEECA-6DU04	VEECA-6DU05	VEECA-6DU06	VEECA-6DU07	VEECA-6DU08
Sample ID	VEECA-6SMI04-0211	VEECA-6SMI05-0211	VEECA-6SMI06-0211	VEECA-6SMI07-0211	VEECA-6SMI08-0211
Sample Date	02/17/11	02/17/11	02/17/11	02/17/11	02/17/11
Chemical Name					
Total Metals (MG/KG)					
Aluminum	32,300	15,800	6,960	34,800	5,110
Arsenic	4.1	4.6	2.8	5.6	0.98 J
Barium	70.4	39.5	39.3	82.2	30.1
Beryllium	0.76 J	0.32 J	0.5 U	0.82 J	0.5 U
Cadmium	0.23 J	0.23 J	0.5 U	0.25 J	0.5 U
Calcium	21,300	43,200	123,000	20,200	102,000
Chromium	37.1	20.3	10.9	48.9 J	7.1
Chromium (hexavalent)	0.12 U	0.056	0.025 U	0.025 U	0.12 U
Cobalt	6.7	4.1 J	2.4 J	7.5	2.3 J
Copper	10.5 J	12.2 J	12.3 J	20	14.7 J
Iron	25,900	12,400	5,980	29,200	6,020
Lead	9.2 J	4.8 J	1.3 J	10	4 J
Magnesium	5,100	4,560	6,150	5,310	8,610
Manganese	544	411	364	660	205
Nickel	11.5	7.3	4.4 J	15.5	3.6 J
Potassium	7,580	3,810	1,240	7,900 J	1,380
Selenium	1.2 J	2 U	1.5 J	2.4 J	2 U
Sodium	259 J	238 J	178 J	257 J	265 J
Thallium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	41.1	24.7	15.7	44.2	15.2
Zinc	25.3	18.6	13.5	27.5	19.5

Notes:
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram

TABLE 4-3
Incremental Background Sample Results
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	VEECA-6DU09	VEECA-6DU10
Sample ID	VEECA-6SMI09-0211	VEECA-6SMI10-0211
Sample Date	02/17/11	02/17/11
Chemical Name		
Total Metals (MG/KG)		
Aluminum	11,300	5,380
Arsenic	5.9	2.7
Barium	30.1	59.4
Beryllium	0.15 J	0.5 U
Cadmium	0.18 J	0.25 J
Calcium	99,600	158,000
Chromium	24.5 J	8.7
Chromium (hexavalent)	0.025 U	0.025 U
Cobalt	3.1 J	2 J
Copper	15.7	16.1 J
Iron	10,700	5,860
Lead	2.7 J	2.5 UJ
Magnesium	28,200	11,400
Manganese	356	317
Nickel	8	3.9 J
Potassium	1,650 J	1,060
Selenium	2 U	1.2 J
Sodium	223 J	163 J
Thallium	0.5 U	0.5 U
Vanadium	33.1	17.1
Zinc	20.2	23.5

Notes:
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-1SB01[1]	VEECA-1SB02[1]		VEECA-1DU01[2]			VEECA-1DU02[2]
Sample ID						VEECA-1SB01-1H02-0211	VEECA-1SB02-1H02-0211	VEECA-1SB02P-1H02-0211	VEECA-1SMI01-0211	VEECA-1SMI01T-0211	VEECA-4SMI02TT-0211	VEECA-1SMI02-0211
Sample Date						02/08/11	02/08/11	02/08/11	02/07/11	02/07/11	02/02/11	02/07/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	29 U	30 U	30 U	29 U	30 U	29 U	30 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	29 U	30 U	30 U	29 U	30 U	29 U	30 U
3,5-Dinitroaniline	--	--	--	660	--	29 U	30 U	30 U	29 U	30 U	29 U	30 U
HMX	--	--	4,900,000	1,000,000	10,000	29 U	30 U	30 U	29 U	30 U	29 U	30 U
Nitrobenzene	--	--	24,000	28	2,260	29 U	30 U	30 U	29 R	30 R	29 R	30 R
Perchlorate	--	--	72,000	850	1,000	0.41 U	0.42 U	0.42 U	0.4 U	0.39 U	0.38 U	0.39 U
Tetryl	--	--	250,000	290,000	10,000	29 U	30 U	30 U	29 U	30 U	29 U	30 U
Total Metals (MG/KG)												
Aluminum	35,000	58,200	99,000	1,000,000	--	402 J	258 J	380 J	540	575	16,200	535
Antimony	--	--	41	2.7	78	2 UJ	2.1 UJ	2.1 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	7.7 UJ	7.8 UJ	7.8 UJ	3 U	3 U	**36.1**	3 U
Barium	212	120	19,000	1,000	330	6.6	4.3	6.1	7 J	7.1 J	21	7 J
Beryllium	0.95	1.16	200	4,000	40	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.2 J	0.5 U
Cadmium	2.36	0.299	80	220	32	0.1 UJ	0.1 UJ	0.1 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Calcium	417,000	59,500	--	--	--	318,000	218,000	312,000	**315,000**	**315,000**	**121,000**	**324,000**
Chromium	70.1	79.4	5.6	0.0061	64	7	4.7 J	6.9 J	6.9 J	6.9 J	39.9	6.8 J
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.026 U	0.026 U	0.026 U	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	15.8	11.2	30	5	13	0.51 U	0.52 U	0.52 U	2.5 U	2.5 U	4.5 J	2.5 U
Copper	94.2	24.6	4,100	460	70	0.76 J	0.45 J	0.66 J	1.1 J	2.5 U	21.3 J	2.5 U
Iron	38,100	48,900	72,000	6,600	--	675	483 J	696 J	752	763	21,400	758
Lead	16	17.2	800	270	120	0.51 U	2.6 U	0.52 U	5 U	5 U	2.2 J	5 U
Magnesium	22,200	6,540	--	--	--	14,200 J	10,200 J	13,900 J	**15,000**	**15,000**	**16,500**	**15,500**
Manganese	1,630	1,040	2,300	570	220	25.9	19.5	24.8	27.9	29.7	561	28.5
Nickel	41	23	2,000	14,000	38	0.3 J	0.52 U	0.26 J	2.5 U	2.5 U	11.5	2.5 U
Potassium	10,800	7,900	--	--	--	107	80.3 J	107	169 J	165 J	2,860	177 J
Selenium	1.3	1.31	510	2.8	0.52	5.1 U	5.2 U	5.2 U	2 U	**1.4 J**	0.57 J	2 U
Silver	0.22	--	510	200	560	0.2 U	0.21 U	0.21 U	1 U	1 U	1 U	1 U
Sodium	2,250	338	--	--	--	2,180	1,490 J	2,160 J	**2,530 J**	**2,520 J**	**814 J**	**2,650 J**
Thallium	0.13	--	1.0	1.9	1	0.1 U	0.1 U	0.1 U	1 U	1 U	0.5 U	1 U
Vanadium	55.7	71.7	520	1,800	130	3.4	2.6	3.6	3.9 J	3.9 J	51.3	3.9 J
Zinc	32	34.2	31,000	58,000	120	0.69 J	0.36 J	0.57 J	5 U	5 U	32	5 U
Wet Chemistry												
% Moisture (pct)	--	--	--	--	--	2.3	4.4	4.3	NA	NA	NA	NA
pH (ph)	--	--	--	--	--	8.8	NA	NA	7.9	NA	NA	7.7

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background
Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil
Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)
Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)
Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-2SB03	VEECA-2SB13	VEECA-2DU01[2]	VEECA-2DU02[2]	VEECA-2DU03[2]	VEECA-2DU04[2]	VEECA-2DU05[2]
Sample ID						VEECA-2SB03-0001-0211	VEECA-2SB13-000H-0211	VEECA-2SMI01-0211	VEECA-2SMI02-0211	VEECA-2SMI03-0211	VEECA-2SMI04-0211	VEECA-2SMI05-0211
Sample Date						02/09/11	02/10/11	02/04/11	02/14/11	02/07/11	02/07/11	02/07/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	29 U	30 U	29 U	28 U	21 R	29 U	28 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	29 U	30 U	29 U	28 U	30 U	29 U	28 U
3,5-Dinitroaniline	--	--	--	660	--	29 U	30 U	29 U	28 U	30 U	29 U	28 U
HMX	--	--	4,900,000	1,000,000	10,000	29 U	30 U	29 U	28 U	30 U	29 U	28 U
Nitrobenzene	--	--	24,000	28	2,260	29 U	30 U	29 R	28 R	30 R	29 R	28 R
Perchlorate	--	--	72,000	850	1,000	0.33 J	0.31 J	0.58 U	0.4 J	0.85 U	0.98 U	0.75 U
Tetryl	--	--	250,000	290,000	10,000	40 J	30 U	29 U	28 U	30 U	29 U	28 U
Total Metals (MG/KG)												
Aluminum	35,000	58,200	99,000	1,000,000	--	15,400	9,210	6,560	1,030	23,200	16,300	16,800
Antimony	--	--	41	2.7	78	2.3 U	2.2 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	**21.7**	3.9	6.8 J	3 U	**9.3**	5.9	8
Barium	212	120	19,000	1,000	330	28.5	16	14.7	7.9 J	49.3	26.1	23.4
Beryllium	0.95	1.16	200	4,000	40	0.2 J	0.11 UJ	0.5 U	0.5 U	0.25 J	0.16 J	0.18 J
Cadmium	2.36	0.299	80	220	32	0.06 J	0.11 U	0.15 J	0.5 U	0.28 J	0.25 J	0.15 J
Calcium	417,000	59,500	--	--	--	169,000	255,000	**170,000**	**285,000**	**73,500**	**130,000**	**134,000**
Chromium	70.1	79.4	5.6	0.0061	64	29	17.8	14.5	6.2	49.7 J	29.1 J	27.8 J
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.14 U	0.028 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	15.8	11.2	30	5	13	5.9	3	2 J	2.5 U	11	8	5.6
Copper	94.2	24.6	4,100	460	70	19.3	11.9	8.8 J	2.5 UJ	22.1	21.6	20.8
Iron	38,100	48,900	72,000	6,600	--	17,300	9,290	7,650	1,440	26,700	19,100	19,000
Lead	16	17.2	800	270	120	1.3	0.56 U	2.5 U	2.5 UJ	1.7 J	9.8	2.5 U
Magnesium	22,200	6,540	--	--	--	6,880 J	8,550 J	**6,940**	**10,000**	**7,730**	**7,340**	**8,800**
Manganese	1,630	1,040	2,300	570	220	479	211	219	46.3	651	556	396
Nickel	41	23	2,000	14,000	38	10.1	4.7	4 J	2.5 U	14.9	9.2	9.2
Potassium	10,800	7,900	--	--	--	3,760	1,970	1,560	293 J	4,990	3,380	3,730
Selenium	1.3	1.31	510	2.8	0.52	1.1	0.63	1.2 J	2 U	0.74 J	0.86 J	1.1 J
Silver	0.22	--	510	200	560	0.23 UJ	0.22 UJ	1 U	1 U	1 U	1 U	1 U
Sodium	2,250	338	--	--	--	381 J	1,300	**1,970**	**2,150 J**	**947 J**	**802 J**	**800 J**
Thallium	0.13	--	1.0	1.9	1	0.1 J	0.056 J	0.5 U	1 U	0.5 U	0.5 U	1 U
Vanadium	55.7	71.7	520	1,800	130	34.9	19.8	16.2	4 J	66.7	42.5	39.3
Zinc	32	34.2	31,000	58,000	120	25 J	15.2 J	14.8	2.5 J	**37.1**	**63.8**	31.4
Wet Chemistry												
% Moisture (pct)	--	--	--	--	--	13.6	10.9	NA	NA	NA	NA	NA
pH (ph)	--	--	--	--	--	NA	NA	7.7	7.8	7.8	8	8

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-3SB01[1]	VEECA-3SB02[1]		VEECA-3SB03[1]	VEECA-3SB04[1]	VEECA-3SB05[1]	VEECA-3DU01[2]
Sample ID						VEECA-3SB01-0001-0211	VEECA-3SB02-0001-0211	VEECA-3SB02P-0001-0211	VEECA-3SB03-0002-0211	VEECA-3SB04-001H-0211	VEECA-3SB05-0002-0211	VEECA-3SMI01-0211
Sample Date						02/11/11	02/11/11	02/11/11	02/10/11	02/14/11	02/10/11	02/14/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	30 U	30 U	30 U	29 U	30 U	30 U	28 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	30 U	30 U	30 U	29 U	30 U	30 U	28 U
3,5-Dinitroaniline	--	--	--	660	--	30 U	30 U	30 U	29 U	30 U	30 U	28 U
HMX	--	--	4,900,000	1,000,000	10,000	30 U	30 U	30 U	29 U	30 U	30 U	28 U
Nitrobenzene	--	--	24,000	28	2,260	30 U	30 U	30 U	29 U	30 U	30 U	28 R
Perchlorate	--	--	72,000	850	1,000	0.51 U	0.48 U	0.51 U	0.45 U	0.5 U	0.44 U	0.27 J
Tetryl	--	--	250,000	290,000	10,000	30 U	30 U	30 U	29 U	30 U	30 U	28 U
Total Metals (MG/KG)												
Aluminum	35,000	58,200	99,000	1,000,000	--	1,940	14,900	16,000	20,200	1,910	975	11,900
Antimony	--	--	41	2.7	78	2.7 U	2.4 U	2.6 U	2.4 U	2.5 U	2.2 U	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	2 U	5.8	**13.5**	7.1	1.9 UJ	1.7 U	3.9 J
Barium	212	120	19,000	1,000	330	9.6	12.3	13	21.9	10.4	8.1	73.2
Beryllium	0.95	1.16	200	4,000	40	0.13 UJ	0.11 J	0.13 J	0.18 J	0.13 U	0.11 UJ	0.5 U
Cadmium	2.36	0.299	80	220	32	0.13 U	0.12 U	0.13 U	0.12 U	0.063 J	0.11 U	0.5 U
Calcium	417,000	59,500	--	--	--	328,000	179,000	162,000	164,000	338,000	334,000	**108,000**
Chromium	70.1	79.4	5.6	0.0061	64	8.5	30.1	31.3	37.5	8.2	6.7	31.5
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.033 U	0.03 U	0.032 U	0.031 U	0.031 U	0.028 U	0.025 U
Cobalt	15.8	11.2	30	5	13	0.36 J	5.7	6.7	9.1	0.5 J	0.56 U	8.9
Copper	94.2	24.6	4,100	460	70	2.7	11.7	13.3	20.3	3.7	2.2	16.1 J
Iron	38,100	48,900	72,000	6,600	--	1,560	15,400	16,800	21,500	4,660	1,720	17,800
Lead	16	17.2	800	270	120	3.3 U	0.6 U	0.64 U	0.61 U	3.1 U	0.56 U	2.5 UJ
Magnesium	22,200	6,540	--	--	--	9,080 J	5,750 J	6,310 J	7,020 J	10,400	10,400 J	**7,500**
Manganese	1,630	1,040	2,300	570	220	47.4	149	149	537	56.5	46.7	422
Nickel	41	23	2,000	14,000	38	0.84 J	8.9	10	11.2	1.1 J	0.49 J	10.7
Potassium	10,800	7,900	--	--	--	550	4,370	4,500	3,870	511	240	2,380
Selenium	1.3	1.31	510	2.8	0.52	0.7	0.29 J	0.57	0.52	1.3 U	0.4	2 U
Silver	0.22	--	510	200	560	0.27 UJ	0.24 UJ	0.26 UJ	0.24 UJ	0.25 U	0.22 UJ	1 U
Sodium	2,250	338	--	--	--	**4,040**	**4,500**	**4,570**	**3,010**	**4,280**	**2,720**	**7,230 J**
Thallium	0.13	--	1.0	1.9	1	0.13 U	0.091 J	0.093 J	0.077 J	0.13 U	0.11 U	1 U
Vanadium	55.7	71.7	520	1,800	130	4.7	43.3	49.2	**66.7**	8	4.4	61.6
Zinc	32	34.2	31,000	58,000	120	3 J	16.9 J	18.8 J	26.4 J	5.9	3 J	22.8 J
Wet Chemistry												
% Moisture (pct)	--	--	--	--	--	24.7	17.2	22.4	18.3	20	10.4	NA
pH (ph)	--	--	--	--	--	7.9	7.9	NA	7.7	7.7	7.9	7.6

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-3DU02[2]	VEECA-3DU03[2]	VEECA-3DU04[2]			VEECA-3DU05[2]	VEECA-4SS01[1]	
Sample ID						VEECA-3SMI02-0211	VEECA-3SMI03-0211	VEECA-3SMI04-0211	VEECA-3SMI04T-0211	VEECA-3SMI04TT-0211	VEECA-3SMI05-0211	VEECA-4SS01-0001-0211	VEECA-4SS01P-0001-0211
Sample Date						02/14/11	02/14/11	02/14/11	02/14/11	02/14/11	02/14/11	02/08/11	02/08/11
Chemical Name													
Explosives (UG/KG)													
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	29 U	30 U	28 U	29 U	29 U	29 U	NA	NA
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	29 U	30 U	28 U	29 U	29 U	29 U	NA	NA
3,5-Dinitroaniline	--	--	--	660	--	29 U	30 U	28 U	29 U	29 U	29 U	NA	NA
HMX	--	--	4,900,000	1,000,000	10,000	29 U	30 U	28 U	29 U	29 U	29 U	NA	NA
Nitrobenzene	--	--	24,000	28	2,260	29 R	30 R	28 R	29 R	29 R	29 R	NA	NA
Perchlorate	--	--	72,000	850	1,000	0.38 U	0.39 U	0.41 U	0.39 U	0.41 U	0.41 U	NA	NA
Tetryl	--	--	250,000	290,000	10,000	29 U	30 U	28 U	29 U	29 U	29 U	NA	NA
Total Metals (MG/KG)													
Aluminum	35,000	58,200	99,000	1,000,000	--	10,700	5,660	7,130	4,450	6,090	1,840	**36,800 J**	**37,100 J**
Antimony	--	--	41	2.7	78	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	2.3 UJ	1.5 J
Arsenic	9.17	8.47	1.6	3.1	18	4.8 J	3 U	3 U	3 U	1.9 J	3 U	**23.8 J**	**23.7 J**
Barium	212	120	19,000	1,000	330	17.2	12.4	11.9	9.9 J	10.9	9.1 J	43.4	44.2
Beryllium	0.95	1.16	200	4,000	40	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.84	0.85
Cadmium	2.36	0.299	80	220	32	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.092 J	0.091 J
Calcium	417,000	59,500	--	--	--	**152,000**	**246,000**	**222,000**	**248,000**	**259,000**	**290,000**	121,000	124,000
Chromium	70.1	79.4	5.6	0.0061	64	24.3	11.2	15.7	10.8	14.3	6.6	65.2	65.9
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	**0.067 J**	**0.067 J**
Cobalt	15.8	11.2	30	5	13	5	1.5 J	3.4 J	1.7 J	2.9 J	2.5 U	8.1	8.3
Copper	94.2	24.6	4,100	460	70	11.1 J	6.4 J	7.9 J	5.1 J	7.3 J	3.1 J	18.9	19.2
Iron	38,100	48,900	72,000	6,600	--	12,900	4,620	8,040	5,240	7,170	1,840	37,100	**38,300**
Lead	16	17.2	800	270	120	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	5 UJ	2.5 UJ	**29.7 J**	**56.1 J**
Magnesium	22,200	6,540	--	--	--	**6,610**	**8,050**	**9,160**	**9,220**	**9,890**	**9,890**	8,330 J	8,300 J
Manganese	1,630	1,040	2,300	570	220	203	87.7	174	117	161	52.5	581	587
Nickel	41	23	2,000	14,000	38	7.1	2.6 J	4 J	2.1 J	3.6 J	2.5 U	17.5	17.7
Potassium	10,800	7,900	--	--	--	2,890	1,690	1,770	1,220	1,620	625	6,180	5,910
Selenium	1.3	1.31	510	2.8	0.52	2 U	2 U	2 U	2 U	2 U	2 U	**2.6**	**2.7**
Silver	0.22	--	510	200	560	1 U	1 U	1 U	1 U	1 U	1 U	0.23 U	0.24 U
Sodium	2,250	338	--	--	--	**8,570 J**	**7,260 J**	**7,160 J**	**6,140 J**	**7,860 J**	**7,620 J**	282	293
Thallium	0.13	--	1.0	1.9	1	1 U	1 U	1 U	1 U	1 U	1 U	**0.27**	**0.26**
Vanadium	55.7	71.7	520	1,800	130	45.4	13.2	23.1	14.6	20.8	6.6 J	**65.6**	**66.3**
Zinc	32	34.2	31,000	58,000	120	16.1 J	7.6 J	11.9 J	7.6 J	10.7 J	3.8 J	28.7	28.8
Wet Chemistry													
% Moisture (pct)	--	--	--	--	--	NA	NA	NA	NA	NA	NA	14.3	15.4
pH (ph)	--	--	--	--	--	7.9	7.7	7.8	NA	NA	7.7	7.9	NA

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-4SB01[1]	VEECA-4DU01[2]	VEECA-4DU02[2]			VEECA-4DU03[2]	VEECA-4DU04[2]	VEECA-4DU05[2]	VEECA-4DU06[2]
Sample ID						VEECA-4SB01-001H-0211	VEECA-4SMI01-0211	VEECA-4SMI02-0211	VEECA-4SMI02T-0211	VEECA-4SMI02TT-0211	VEECA-4SMI03-0211	VEECA-4SMI04-0211	VEECA-4SMI05-0211	VEECA-4SMI06-0211
Sample Date						02/18/11	02/02/11	02/02/11	02/02/11	02/02/11	02/07/11	02/15/11	02/07/11	02/15/11
Chemical Name														
Explosives (UG/KG)														
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	30 U	28 U	30 U	30 U	29 U	26 R	30 U	12 NJ	30 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	30 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
3,5-Dinitroaniline	--	--	--	660	--	30 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
HMX	--	--	4,900,000	1,000,000	10,000	30 U	28 U	30 U	30 U	29 U	30 U	30 U	27 NJ	30 U
Nitrobenzene	--	--	24,000	28	2,260	30 U	28 R	30 R	30 R	29 R	**98 NJ**	30 U	29 R	30 U
Perchlorate	--	--	72,000	850	1,000	0.5 U	0.67 U	0.39 U	0.43 U	0.38 U	1.7 U	1.6 J	0.88 U	1.3 J
Tetryl	--	--	250,000	290,000	10,000	30 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
Total Metals (MG/KG)														
Aluminum	35,000	58,200	99,000	1,000,000	--	7,700	19,000	16,200	16,000	16,200	18,700	14,500	21,100	19,200
Antimony	--	--	41	2.7	78	2.5 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	5.9	**17.1**	**33.9**	**35**	**36.1**	6.1	5.4	8	**13.4**
Barium	212	120	19,000	1,000	330	15.5	33.7	20.5	20.6	21	38.8	22.3	33.9	33.6
Beryllium	0.95	1.16	200	4,000	40	0.13 U	0.37 J	0.19 J	0.18 J	0.2 J	0.21 J	0.5 U	0.26 J	0.22 J
Cadmium	2.36	0.299	80	220	32	0.1 J	0.26 J	0.5 U	0.5 U	0.5 U	0.28 J	0.18 J	0.23 J	0.15 J
Calcium	417,000	59,500	--	--	--	282,000	**70,000**	**119,000**	**129,000**	**121,000**	**78,300**	**149,000**	**64,900**	**142,000**
Chromium	70.1	79.4	5.6	0.0061	64	22.5	32.1	39.9	38.7	39.9	47.7 J	34.6	37.1 J	36.3
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.032 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.025 U
Cobalt	15.8	11.2	30	5	13	5.9	5	4.5 J	4.3 J	4.5 J	**11.4**	7.6	**12.5**	7.2
Copper	94.2	24.6	4,100	460	70	12.1	19.3 J	22.2 J	20.1 J	21.3 J	21.6	17.8	**24.8**	21.4
Iron	38,100	48,900	72,000	6,600	--	11,800	20,800	21,700	20,600	21,400	23,800	18,800	27,200	22,700
Lead	16	17.2	800	270	120	3.2 U	5	2.1 J	1.7 J	2.2 J	2.5 U	2.5 U	1.7 J	1.3 J
Magnesium	22,200	6,540	--	--	--	5,430	**7,000**	**15,800**	**15,600**	**16,500**	**6,900**	6,350	**7,580**	5,830
Manganese	1,630	1,040	2,300	570	220	646	473	552	538	561	832	670 J	737	683 J
Nickel	41	23	2,000	14,000	38	6	11	11.7	11.3	11.5	12.8	9.8	13.3	12
Potassium	10,800	7,900	--	--	--	2,000	4,730	2,920	2,760	2,860	3,270	2,490	3,580	2,890
Selenium	1.3	1.31	510	2.8	0.52	1.3 U	0.91 J	0.71 J	0.71 J	0.57 J	1.1 J	0.54 J	**1.6**	**1.7 J**
Silver	0.22	--	510	200	560	0.12 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	2,250	338	--	--	--	**3,870 J**	**537 J**	**718 J**	**756 J**	**814 J**	**384 J**	**2,490 J**	273 J	225 J
Thallium	0.13	--	1.0	1.9	1	0.64 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Vanadium	55.7	71.7	520	1,800	130	53.9 J	33.6	51.1	49.3	51.3	66.2	59.6	71.4	69.5
Zinc	32	34.2	31,000	58,000	120	18	**35**	32.6	32.1	32	33.5	28.5	**39.4**	**34.4**
Wet Chemistry														
% Moisture (pct)	--	--	--	--	--	21.6	NA	NA	NA	NA	NA	NA	NA	NA
pH (ph)	--	--	--	--	--	8.1	7.6	8.1	NA	NA	7.9	7.9	8	8.1

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-4DU07[2]	VEECA-4DU08[2]	VEECA-4DU09[2]			VEECA-4DU10[2]	VEECA-4DU11[2]		
Sample ID						VEECA-4SMI07-0211	VEECA-4SMI08-0211	VEECA-4SMI09-0211	VEECA-4SMI09T-0211	VEECA-4SMI09TT-0211	VEECA-4SMI10-0211	VEECA-4SMI11-0211	VEECA-4SMI11T-0211	VEECA-4SMI11TT-0211
Sample Date						02/15/11	02/14/11	02/15/11	02/15/11	02/15/11	02/15/11	02/03/11	02/03/11	02/03/11
Chemical Name														
Explosives (UG/KG)														
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	26 NJ	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U
3,5-Dinitroaniline	--	--	--	660	--	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U
HMX	--	--	4,900,000	1,000,000	10,000	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U
Nitrobenzene	--	--	24,000	28	2,260	31 U	30 R	29 U	29 U	30 U	31 U	31 R	30 R	30 R
Perchlorate	--	--	72,000	850	1,000	1.2 J	1.5 J	0.92 J	1.1 J	0.84 J	0.81 J	0.52 U	0.51 U	0.47 U
Tetryl	--	--	250,000	290,000	10,000	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U
Total Metals (MG/KG)														
Aluminum	35,000	58,200	99,000	1,000,000	--	20,400	22,100	25,200	25,900	22,500	16,000	16,500	15,500	16,500
Antimony	--	--	41	2.7	78	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	8.3	**8.8**	**9.9**	**11.4**	**11.1**	**13.3**	**14.5 J**	**14.6 J**	**14.5 J**
Barium	212	120	19,000	1,000	330	29.9	26.7	27.1	27.4	23.4	18.1	22.5	21.6	22.1
Beryllium	0.95	1.16	200	4,000	40	0.24 J	0.27 J	0.31 J	0.31 J	0.28 J	0.18 J	0.18 J	0.16 J	0.2 J
Cadmium	2.36	0.299	80	220	32	0.18 J	0.18 J	**0.45 J**	**0.46 J**	**0.4 J**	0.2 J	0.5 U	0.5 U	0.5 U
Calcium	417,000	59,500	--	--	--	**120,000**	**105,000**	**102,000**	**98,400**	**85,600**	**154,000**	**153,000**	**155,000**	**152,000**
Chromium	70.1	79.4	5.6	0.0061	64	36.9	37.2	41.9	41.7	37.2	30.6	31.3	29.1	31.3
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.025 U	0.025 U
Cobalt	15.8	11.2	30	5	13	7.8	7.3	7.5	7.5	6.6	4.1 J	5.1	4.9 J	5.1
Copper	94.2	24.6	4,100	460	70	22.1	19.4 J	23.1	22.9	20.3	17.8	20.9 J	18.3 J	19.4 J
Iron	38,100	48,900	72,000	6,600	--	22,800	23,500	26,300	26,600	23,000	19,000	21,100	19,800	21,300
Lead	16	17.2	800	270	120	2.5 U	1.5 J	2 J	1.9 J	2 J	2.5 U	1.3 J	1.3 J	1.8 J
Magnesium	22,200	6,540	--	--	--	**7,140**	6,530	**7,860**	**7,830**	**6,850**	6,500	5,800	5,510	5,800
Manganese	1,630	1,040	2,300	570	220	584 J	528	543 J	533 J	463 J	321 J	389	371	389
Nickel	41	23	2,000	14,000	38	12.2	11.7	13.1	13	11.4	8.8	9.1	8.4	8.9
Potassium	10,800	7,900	--	--	--	4,180	4,460	5,400	5,470	4,810	2,660	2,530	2,370	2,540
Selenium	1.3	1.31	510	2.8	0.52	**1.8 J**	2 U	**1.4 J**	**1.4 J**	**1.7 J**	**1.9 J**	1.2 J	1.2 J	1.2 J
Silver	0.22	--	510	200	560	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	2,250	338	--	--	--	**415 J**	252 J	306 J	299 J	258 J	297 J	272 J	263 J	268 J
Thallium	0.13	--	1.0	1.9	1	1 U	1 U	0.5 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U
Vanadium	55.7	71.7	520	1,800	130	48.1	48.2	48.6	49.2	43.7	39.6	47.3	44.4	48.1
Zinc	32	34.2	31,000	58,000	120	**36.9**	33.8 J	**41.9**	**41.4**	**42.4**	28.4	30.9	27.9	29.6
Wet Chemistry														
% Moisture (pct)	--	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH (ph)	--	--	--	--	--	8.1	8.2	7.9	NA	NA	8.1	8	NA	NA

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-4
Explosives and Total Metals Detection and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**East Vieques Incremental Background Values**	**June RSL Industrial Soil Adjusted**	**Vieques ECA SSLs (DAF = 10)**	**Vieques ESVs Soil**	VEECA-4DU12[2]	VEECA-4DU13[2]	VEECA-4DU14[2]	VEECA-4DU15[2]
Sample ID						VEECA-4SMI12-0211	VEECA-4SMI13-0211	VEECA-4SMI14-0211	VEECA-4SMI15-0211
Sample Date						02/04/11	02/03/11	02/03/11	02/03/11
Chemical Name									
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	--	--	2,700,000	1,900,000	--	28 U	29 U	31 U	30 U
2,4,6-Trinitrotoluene	--	--	42,000	6,400	10,000	28 U	29 U	31 U	30 U
3,5-Dinitroaniline	--	--	--	660	--	28 U	29 U	31 U	13 J
HMX	--	--	4,900,000	1,000,000	10,000	28 U	29 U	31 U	30 U
Nitrobenzene	--	--	24,000	28	2,260	28 R	29 R	31 R	30 R
Perchlorate	--	--	72,000	850	1,000	0.43 U	0.39 U	0.41 U	0.4 U
Tetryl	--	--	250,000	290,000	10,000	28 U	29 U	31 U	30 U
Total Metals (MG/KG)									
Aluminum	35,000	58,200	99,000	1,000,000	--	24,400	24,600	20,200	33,900
Antimony	--	--	41	2.7	78	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	9.17	8.47	1.6	3.1	18	**13.9 J**	**12.6 J**	**10.2 J**	**27.5 J**
Barium	212	120	19,000	1,000	330	36.1	43.3	33.4	43.2
Beryllium	0.95	1.16	200	4,000	40	0.47 J	0.53 J	0.41 J	0.97 J
Cadmium	2.36	0.299	80	220	32	0.5 U	0.5 U	0.5 U	0.15 J
Calcium	417,000	59,500	--	--	--	**77,200**	**83,400**	**77,400**	26,300
Chromium	70.1	79.4	5.6	0.0061	64	44.6	43	38.2	59.4
Chromium (hexavalent)	--	--	5.6	0.0061	--	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	15.8	11.2	30	5	13	5.3	6.2	4.5 J	10.5
Copper	94.2	24.6	4,100	460	70	20.2 J	21.4 J	19.2 J	19.9 J
Iron	38,100	48,900	72,000	6,600	--	24,500	26,300	20,000	38,000
Lead	16	17.2	800	270	120	5.6	6.7	5.3	15
Magnesium	22,200	6,540	--	--	--	**11,500**	**8,930**	**13,200**	**7,140**
Manganese	1,630	1,040	2,300	570	220	540	509	473	838
Nickel	41	23	2,000	14,000	38	12.3	12.7	11.8	17.1
Potassium	10,800	7,900	--	--	--	3,820	4,840	3,180	7,170
Selenium	1.3	1.31	510	2.8	0.52	0.79 J	0.64 J	0.81 J	0.5 J
Silver	0.22	--	510	200	560	1 U	1 U	1 U	1 U
Sodium	2,250	338	--	--	--	287 J	**396 J**	**387 J**	**658 J**
Thallium	0.13	--	1.0	1.9	1	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	55.7	71.7	520	1,800	130	46.1	44.6	39	67.6
Zinc	32	34.2	31,000	58,000	120	**36.5**	32.4	31.1	**41.9**
Wet Chemistry									
% Moisture (pct)	--	--	--	--	--	NA	NA	NA	NA
pH (ph)	--	--	--	--	--	7.9	8	7.6	8

Notes:

Exceeds Vieques (East) Background Zone TI or Incremental Background

Exceeds Vieques (East) Background Zone TI or Incremental Background and ESVs Soil

Exceeds Vieques (East) Background Zone TI or Incremental Background and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI or Incremental Background, Adjusted RSL for Industrial Soil, ESVs Soil and SSL (DAF=10)

J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
R - Unreliable Result
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram
[1] Screened against Vieques (East) Background Zone TI
[2] Screened against East Vieques Incremental Background Values

TABLE 4-5
Explosives and Total Metals Detection and Exceedances in Subsurface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**June RSL Industrial Soil Adjusted**	**Vieques ECA Beach SSLs (DAF = 10)**	**Vieques ECA SSLs (DAF = 10)**	VEECA-2SB01	VEECA-2SB02		VEECA-2SB04	VEECA-2SB05
Sample ID					VEECA-2SB01-0103-0211	VEECA-2SB02-0103-0211	VEECA-2SB02P-0103-0211	VEECA-2SB04-0507-0211	VEECA-2SB05-0507-0211
Sample Date					02/09/11	02/09/11	02/09/11	02/09/11	02/09/11
Chemical Name									
Explosives (UG/KG)									
no detections									
Total Metals (MG/KG)									
Aluminum	35,000	99,000	1,000,000	1,000,000	979	5,860	5,060	656	919
Arsenic	9.17	1.6	3.1	3.1	1 J	**13.8**	**14.3**	0.34 U	0.63
Barium	212	19,000	1,000	1,000	7.8	11.6	11.4	6.8	7.9
Beryllium	0.95	200	4,000	4,000	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ
Cadmium	2.36	80	220	220	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Calcium	417,000	--	--	--	332,000	329,000	333,000	354,000	356,000
Chromium	70.1	5.6	0.0061	0.0061	6.6	12.8	11.4	7	6.8
Chromium (hexavalent)	--	5.6	0.0061	0.0061	0.029 U	0.13 U	0.13 U	0.028 U	0.027 U
Cobalt	15.8	30	5	5	0.32 J	2.1	2.1	0.56 U	0.43 J
Copper	94.2	4,100	460	460	1.9	7.7	7	0.93 J	1.7
Iron	38,100	72,000	6,600	6,600	1,130	8,130	7,330	1,240	2,020
Lead	7.7	800	270	270	0.57 U	0.31 J	0.53 U	0.56 U	0.55 U
Magnesium	22,200	--	--	--	9,920 J	3,130 J	2,840 J	12,700 J	11,500 J
Manganese	1,630	2,300	570	570	48.6	276	319	42.3	54.6
Nickel	41	2,000	14,000	14,000	0.62 J	3.8	3.6	0.46 J	0.68 J
Potassium	10,800	--	--	--	211	1,020	884	154	192
Selenium	1.3	510	2.8	2.8	0.54	0.5	0.57	0.41	**1.9**
Sodium	2,250	--	--	--	**2,280 J**	179 J	162 J	2,090 J	**2,310 J**
Thallium	0.13	1.0	1.9	1.9	0.11 U	0.063 J	0.063 J	0.11 U	0.11 U
Vanadium	55.7	520	1,800	1,800	3.5	26.7	25.6	4.6	6.5
Zinc	32	31,000	58,000	58,000	2 J	10.2 J	9.5 J	1.4 J	2.5 J
Wet Chemistry									
% Moisture (pct)	--	--	--	--	13	6	5.8	10.6	9.1
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA

Notes:

Exceeds Vieques (East) Background Zone TI

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI, Adjusted RSL for Industrial Soil and SSL (DAF=10)

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

NA - Not analyzed

U - Not detected or not detected at significantly greater than that in an associated blank

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/KG - Micrograms per kilogram

[1] Discrete samples collected from Decision Unit 1 (DU 1) are screened against ECA Beach SSLs DAF 10 rather than against ECA SSLs DAF 10.

TABLE 4-5
Explosives and Total Metals Detection and Exceedances in Subsurface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**June RSL Industrial Soil Adjusted**	**Vieques ECA Beach SSLs (DAF = 10)**	**Vieques ECA SSLs (DAF = 10)**	VEECA-2SB06	VEECA-2SB07	VEECA-2SB08	VEECA-2SB09	
Sample ID					VEECA-2SB06-0507-0211	VEECA-2SB07-0H2H-0211	VEECA-2SB08-0204-0211	VEECA-2SB09-4H6H-0211	VEECA-2SB09P-4H6H-0211
Sample Date					02/09/11	02/08/11	02/08/11	02/08/11	02/08/11
Chemical Name									
Explosives (UG/KG)									
no detections									
Total Metals (MG/KG)									
Aluminum	35,000	99,000	1,000,000	1,000,000	761	12,600 J	9,360 J	12,100 J	14,200 J
Arsenic	9.17	1.6	3.1	3.1	0.47 J	8.8 UJ	**71.8 J**	1.8 UJ	1.8 UJ
Barium	212	19,000	1,000	1,000	7.2	30.2	40.8	133 J	44.7 J
Beryllium	0.95	200	4,000	4,000	0.11 UJ	0.12 U	0.12 U	0.12 U	0.12 U
Cadmium	2.36	80	220	220	0.11 U	0.092 J	0.048 J	0.23 J	0.26 J
Calcium	417,000	--	--	--	350,000	248,000	261,000	212,000	218,000
Chromium	70.1	5.6	0.0061	0.0061	6.5	26.8	17.2	28.8	33.1
Chromium (hexavalent)	--	5.6	0.0061	0.0061	0.027 U	**0.013 J**	0.15 U	**0.067 J**	0.15 U
Cobalt	15.8	30	5	5	0.54 U	8.4	7.3	8.4	9.2
Copper	94.2	4,100	460	460	1.1 J	14.3	9.5	11	11.9
Iron	38,100	72,000	6,600	6,600	1,260	17,400	14,900	20,100	23,000
Lead	7.7	800	270	270	0.54 U	2.9 U	2.9 U	2.9 U	2.9 U
Magnesium	22,200	--	--	--	11,900 J	4,880 J	6,190 J	5,100 J	5,440 J
Manganese	1,630	2,300	570	570	45.6	592	212	550	562
Nickel	41	2,000	14,000	14,000	0.47 J	10.8	7.1	9.1	9.6
Potassium	10,800	--	--	--	175	1,750	873	564	679
Selenium	1.3	510	2.8	2.8	0.36	5.8 U	1.2 U	1.2 U	1.2 U
Sodium	2,250	--	--	--	1,940 J	2,040	1,450	2,220	**2,510**
Thallium	0.13	1.0	1.9	1.9	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U
Vanadium	55.7	520	1,800	1,800	4.5	**73.1**	**57.4**	**72**	**78.8**
Zinc	32	31,000	58,000	58,000	1.7 J	15.5	15.4	18.3	19.5
Wet Chemistry									
% Moisture (pct)	--	--	--	--	8	14.4	14.4	14.5	15.1
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA

Notes:

Exceeds Vieques (East) Background Zone TI

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI, Adjusted RSL for Industrial Soil and SSL (DAF=10)

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

NA - Not analyzed

U - Not detected or not detected at significantly greater than that in an associated blank

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/KG - Micrograms per kilogram

[1] Discrete samples collected from Decision Unit 1 (DU 1) are screened against ECA Beach SSLs DAF 10 rather than against ECA SSLs DAF 10.

TABLE 4-5
Explosives and Total Metals Detection and Exceedances in Subsurface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**Vieques (East) Background Zone TI**	**June RSL Industrial Soil Adjusted**	**Vieques ECA Beach SSLs (DAF = 10)**	**Vieques ECA SSLs (DAF = 10)**	VEECA-2SB10	VEECA-2SB11	VEECA-2SB12	VEECA-2SB14	VEECA-2SB15
Sample ID					VEECA-2SB10-0204-0211	VEECA-2SB11-7H9H-0211	VEECA-2SB12-0H2H-0211	VEECA-2SB14-1H3H-0211	VEECA-2SB15-0406-0211
Sample Date					02/10/11	02/11/11	02/11/11	02/10/11	02/10/11
Chemical Name									
Explosives (UG/KG)									
no detections									
Total Metals (MG/KG)									
Aluminum	35,000	99,000	1,000,000	1,000,000	11,700	14,100	15,000	6,160	8,660
Arsenic	9.17	1.6	3.1	3.1	5.8	**14.3**	7	3.9	**20.6**
Barium	212	19,000	1,000	1,000	15.2	14.7	12.7	12.8	14.7
Beryllium	0.95	200	4,000	4,000	0.077 J	0.4 J	0.12 J	0.11 UJ	0.043 J
Cadmium	2.36	80	220	220	0.12 U	0.12 U	0.12 U	0.11 U	0.12 U
Calcium	417,000	--	--	--	195,000	21,700	167,000	320,000	270,000
Chromium	70.1	5.6	0.0061	0.0061	26.6	50.1	28.9	12.9	17.1
Chromium (hexavalent)	--	5.6	0.0061	0.0061	0.031 U	0.031 U	0.031 U	0.13 U	0.15 U
Cobalt	15.8	30	5	5	12.1	**19.4**	7.1	4.7	8.5
Copper	94.2	4,100	460	460	14.7	42.8	16	10.8	18.7
Iron	38,100	72,000	6,600	6,600	13,900	36,400	16,600	10,500	15,200
Lead	7.7	800	270	270	0.61 U	2.3	0.62 U	0.31 J	1.2 U
Magnesium	22,200	--	--	--	8,400 J	6,770 J	6,830 J	3,030 J	4,350 J
Manganese	1,630	2,300	570	570	485	302	240	175	250
Nickel	41	2,000	14,000	14,000	8.9	16.1	8.4	4.8	8.2
Potassium	10,800	--	--	--	2,210	2,340	3,180	840	1,460
Selenium	1.3	510	2.8	2.8	0.52	0.64	0.64	0.48	0.72
Sodium	2,250	--	--	--	**3,470**	**4,230**	**3,030**	587	1,580
Thallium	0.13	1.0	1.9	1.9	0.077 J	0.09 J	0.07 J	0.11 U	0.12 U
Vanadium	55.7	520	1,800	1,800	44.4	**86.3**	48.4	32.3	42.2
Zinc	32	31,000	58,000	58,000	17.3 J	**43 J**	20.8 J	12.7 J	21 J
Wet Chemistry									
% Moisture (pct)	--	--	--	--	18.5	19.9	19.8	6.3	15.6
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA

Notes:

Exceeds Vieques (East) Background Zone TI

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI, Adjusted RSL for Industrial Soil and SSL (DAF=10)

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

NA - Not analyzed

U - Not detected or not detected at significantly greater than that in an associated blank

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/KG - Micrograms per kilogram

[1] Discrete samples collected from Decision Unit 1 (DU 1) are screened against ECA Beach SSLs DAF 10 rather than against ECA SSLs DAF 10.

TABLE 4-6
Explosives and Total Metals Detection and Exceedances in Surface Water
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**June 2011 RSL Tapwater Adjusted**	**Eco Marine - Surface Water**	VEECA-5SW01	VEECA-5SW02		VEECA-5SW03	VEECA-5SW04	VEECA-5SW05
Sample ID			VEECA-5SW01-0211	VEECA-5SW02-0211	VEECA-5SW02P-0211	VEECA-5SW03-0211	VEECA-5SW04-0211	VEECA-5SW05-0211
Sample Date			02/09/11	02/09/11	02/09/11	02/09/11	02/09/11	02/09/11
Chemical Name								
Explosives (UG/L)								
No Detections	--	--	ND	ND	ND	ND	ND	ND
Total Metals (UG/L)								
Aluminum	3,700	--	2,740 J	1,960 J	2,040 J	2,990 J	2,010 J	2,700 J
Arsenic	0.045	1.4	**2 J**	**1.5 J**	**1.5 J**	**1.7 J**	**1.4 J**	**1.9 J**
Barium	730	200	72.4 J	67.6 J	67.4 J	72.4 J	68.8 J	71.1 J
Calcium	--	--	622,000	591,000	597,000	612,000	604,000	606,000
Chromium	0.043	--	**4.8 J**	**4.2 J**	**5.3**	**7.5**	**4.2 J**	**6.2**
Cobalt	1.1	--	**3.1**	**2.8 J**	**2.7 J**	**3**	**3**	**2.9 J**
Copper	150	3.73	**12**	**11.8**	**10.7**	**11.5**	**12.1**	**11.2**
Iron	2,600	50	**2,060**	**1,700**	**1,950**	**2,530**	**1,910**	**2,140**
Magnesium	--	--	708,000	686,000	683,000	699,000	698,000	699,000
Manganese	88	100	73 J	56.5 J	57.1 J	77.5 J	59 J	71.2 J
Nickel	73	8.28	2 U	2 U	3.6	1.5 J	2.4 R	2.2 J
Potassium	--	--	193,000	184,000	186,000	190,000	186,000	189,000
Selenium	18	71.1	17	2.2 R	2.9 J	2.5 R	5 U	2.5 R
Sodium	--	--	5,710,000 J	5,570,000 J	5,570,000 J	5,650,000 J	5,740,000 J	5,590,000 J
Thallium	0.037	21.3	**0.54 J**	1 U	1 U	1 U	**0.7 J**	1 U
Vanadium	18	50	14	13.1	11.7 J	13.9	11.3 J	13.2
Dissolved Metals (UG/L)								
Arsenic, Dissolved	0.045	36	2 U	2 U	2 U	2 U	**1.1 J**	2 U
Barium, Dissolved	730	200	63.9 J	64.7 J	61.8 J	62.4 J	64 J	67.7 J
Calcium, Dissolved	--	--	560,000	576,000	555,000	551,000	560,000	581,000
Cobalt, Dissolved	1.1	--	**1.9 J**	**1.8 J**	**1.8 J**	**1.8 J**	**2 J**	**1.9 J**
Copper, Dissolved	150	3.1	**10**	**10.3**	**10.2**	**10.2**	**10.5**	**9.9**
Iron, Dissolved	2,600	50	**85.9 J**	**62.7 J**	**72.3 J**	49.7 J	40.9 J	**252**
Magnesium, Dissolved	--	--	661,000	686,000	656,000	652,000	661,000	677,000
Nickel, Dissolved	73	8.2	2.3 J	1.2 J	2 U	1.5 J	5.3 R	3.9
Potassium, Dissolved	--	--	180,000	184,000	178,000	177,000	179,000	187,000
Selenium, Dissolved	18	71	**27 J**	7.2 R	**26.2 J**	12.8 R	**19.2 J**	18.3 R
Sodium, Dissolved	--	--	5,270,000 J	5,620,000 J	5,440,000 J	5,230,000 J	5,300,000 J	5,490,000 J
Vanadium, Dissolved	18	50	4.1 J	4.4 J	5.5 J	4.3 J	3.4 J	5.3 J

Notes:

Exceeds RSL Tap Water Adjusted
Exceeds Eco Marine - Surface Water
Exceeds RSL Tap Water Adjusted and Eco Marine - Surface Water

J - Analyte present, value may or may not be accurate or precise
ND - Not detected
R - Unreliable Result
U - Not detected or not detected at significantly greater than that in an associated blank.
UG/L - Micrograms per liter

TABLE 4-7
Explosives and Total Metals Detection and Exceedances in Sediment
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**June 2011 RSL Industrial Soil Adjusted**	**Eco Marine - Sediment**	VEECA-5SD01	VEECA-5SD02		VEECA-5SD03	VEECA-5SD04	VEECA-5SD05
Sample ID			VEECA-5SD01-000H-0211	VEECA-5SD02-000H-0211	VEECA-5SD02P-000H-0211	VEECA-5SD03-000H-0211	VEECA-5SD04-000H-0211	VEECA-5SD05-000H-0211
Sample Date			02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name								
Explosives (UG/KG)								
No Detections	--	--	ND	ND	ND	ND	ND	ND
Total Metals (MG/KG)								
Aluminum	99,000	18,000	17,700	16,100	13,700	15,900	9,450	**20,000**
Arsenic	1.6	8.2	**3.3 J**	2.2 U	2.2 U	**2 J**	2 U	**1.9 J**
Barium	19,000	48	29.6	27.1	29.2	37.3	26.1	32.7
Beryllium	200	--	0.086 J	0.14 U	0.15 U	0.066 J	0.14 U	0.09 J
Cadmium	80	1.2	0.16 J	0.14 U	0.046 J	0.15 U	0.054 J	0.058 J
Calcium	--	--	196,000	246,000	235,000	208,000	260,000	246,000
Chromium	5.6	81	**32.4**	**28.4**	**25.3**	**29**	**18.2**	**35.5**
Chromium (Hexavalent)	5.6	--	0.05 U	0.036 U	0.037 U	0.038 U	0.034 U	0.037 U
Cobalt	30	10	7.5	5.2	5.4	6.8	4	7.9
Copper	4,100	34	22.3	11.2	12.6	17	9.2	17.6
Iron	72,000	220,000	18,200	13,900	12,700	15,200	8,680	17,700
Magnesium	--	--	15,800	14,300	14,500	16,200	14,000	17,900
Manganese	2,300	260	**418**	**429**	**392**	**462**	**355**	**571**
Nickel	2,000	20.9	10	7.5	7.2	8.9	4.8	10.4
Potassium	--	--	6,160	5,630	4,840	5,480	3,290	6,450
Selenium	510	1	**2 J**	**2.1 J**	**2.2**	**1.9 J**	0.77 J	**2.7**
Sodium	--	--	18,800	4,370	4,510	5,590	5,290	5,810
Thallium	1	--	0.2 U	0.14 U	0.15 U	0.15 U	0.14 U	0.081 J
Vanadium	520	57	51.6	36.3	35.5	44.2	27	53.4
Zinc	31,000	150	28.4	19.4	18.9	22.2	12.4	25.8

Notes:

Exceeds RSL Industrial Soil Adjusted

Exceeds Eco Marine - Sediment

Exceeds RSL Industrial Soil Adjusted and Eco Marine - Sediment

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

ND - Not detected

U - The material was analyzed for, but not detected

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram

TABLE 4-7
Explosives and Total Metals Detection and Exceedances in Sediment
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**June 2011 RSL Industrial Soil Adjusted**	**Eco Marine - Sediment**	VEECA-5SD06	VEECA-5SD07	VEECA-5SD08	VEECA-5SD09	VEECA-5SD10
Sample ID			VEECA-5SD06-000H-0211	VEECA-5SD07-000H-0211	VEECA-5SD08-000H-0211	VEECA-5SD09-000H-0211	VEECA-5SD10-000H-0211
Sample Date			02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name							
Explosives (UG/KG)							
No Detections	--	--	ND	ND	ND	ND	ND
Total Metals (MG/KG)							
Aluminum	99,000	18,000	17,100	17,300	16,700	**19,000**	16,600
Arsenic	1.6	8.2	**1.6 J**	**1.7 J**	**2.4 J**	**2.9 J**	**2.4 J**
Barium	19,000	48	30.3	31.2	34.3	35.5	32.8
Beryllium	200	--	0.083 J	0.085 J	0.078 J	0.11 J	0.08 J
Cadmium	80	1.2	0.071 J	0.06 J	0.059 J	0.16 J	0.084 J
Calcium	--	--	225,000	208,000	209,000	209,000	211,000
Chromium	5.6	81	**31.6**	**31.7**	**30.8**	**34.3**	**30.2**
Chromium (Hexavalent)	5.6	--	0.035 U	0.038 U	0.037 U	0.037 U	0.036 U
Cobalt	30	10	7.4	7.3	6.9	8.3	6.7
Copper	4,100	34	16.8	17.5	15	25.9	14
Iron	72,000	220,000	16,400	16,500	15,700	17,900	15,500
Magnesium	--	--	16,800	15,800	15,000	17,000	14,300
Manganese	2,300	260	**538**	**482**	**496**	**522**	**454**
Nickel	2,000	20.9	9.3	9.5	9	10.8	9
Potassium	--	--	5,810	5,490	5,350	6,490	5,820
Selenium	510	1	**2.3**	**2.1 J**	0.75 J	**2.4**	**1.9 J**
Sodium	--	--	5,030	5,770	5,860	6,100	6,290
Thallium	1	--	0.14 U	0.15 U	0.15 U	0.15 U	0.15 U
Vanadium	520	57	48.4	47.8	47	52.6	40.5
Zinc	31,000	150	25.1	24	23.2	27.2	22.1

Notes:

Exceeds RSL Industrial Soil Adjusted

Exceeds Eco Marine - Sediment

Exceeds RSL Industrial Soil Adjusted and Eco Marine - Sediment

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

ND - Not detected

U - The material was analyzed for, but not detected

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram

TABLE 4-7
Explosives and Total Metals Detection and Exceedances in Sediment
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Station ID	**June 2011 RSL Industrial Soil Adjusted**	**Eco Marine - Sediment**	VEECA-5SD11		VEECA-5SD12	VEECA-5SD13	VEECA-5SD14	VEECA-5SD15
Sample ID			VEECA-5SD11-000H-0211	VEECA-5SD11P-000H-0211	VEECA-5SD12-000H-0211	VEECA-5SD13-000H-0211	VEECA-5SD14-000H-0211	VEECA-5SD15-000H-0211
Sample Date			02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name								
Explosives (UG/KG)								
No Detections	--	--	ND	ND	ND	ND	ND	ND
Total Metals (MG/KG)								
Aluminum	99,000	18,000	10,900	10,000	7,180	7,520	14,300	10,900
Arsenic	1.6	8.2	**2.5 J**	**2.3 J**	**1.7 J**	**3 J**	**2.1 J**	**2.4 J**
Barium	19,000	48	18.3	18.3	16.2	19.2	**48.4**	33.4
Beryllium	200	--	0.14 U	0.13 U	0.15 U	0.14 U	0.054 J	0.056 J
Cadmium	80	1.2	0.068 J	0.063 J	0.075 J	0.15 J	0.053 J	0.066 J
Calcium	--	--	250,000	227,000	190,000	213,000	205,000	163,000
Chromium	5.6	81	**22.5**	**21.4**	**17.8**	**17.7**	**27**	**28.4**
Chromium (Hexavalent)	5.6	--	0.034 U	0.033 U	0.037 U	0.034 U	0.019 J	0.019 J
Cobalt	30	10	4	4.6	3.8	5.1	7	7.8
Copper	4,100	34	12	10.3	8.9	12	12.8	15.3
Iron	72,000	220,000	9,890	9,970	8,180	10,400	15,700	15,900
Magnesium	--	--	9,030	9,170	8,750	9,050	13,800	9,460
Manganese	2,300	260	**310**	**324**	**274**	**340**	**498**	**390**
Nickel	2,000	20.9	5.9	5.8	5	6.3	8.6	9.3
Potassium	--	--	3,480	3,080	2,240	1,730	4,370	1,870
Selenium	510	1	**2.1 J**	1 J	**1.6 J**	0.83 J	**2.3**	1 J
Sodium	--	--	4,100	3,670	5,020	3,350	4,730	3,030
Thallium	1	--	0.14 U	0.13 U	0.15 U	0.14 U	0.14 U	0.13 U
Vanadium	520	57	30.7	32.7	29.9	43.5	47.9	**62.3**
Zinc	31,000	150	14.2	13.5	12.8	13.9	18.8	21.9

Notes:

Exceeds RSL Industrial Soil Adjusted

Exceeds Eco Marine - Sediment

Exceeds RSL Industrial Soil Adjusted and Eco Marine - Sediment

J - Analyte present, value may or may not be accurate or precise
ND - Not detected
U - The material was analyzed for, but not detected
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_4-1_MEC_Items_Recovered_During_TCRA.mxd1/4/2012

- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- Submunitions
- MD (Scrap)
- RRD (Scrap)
- ECA Boundary

N
W E
S

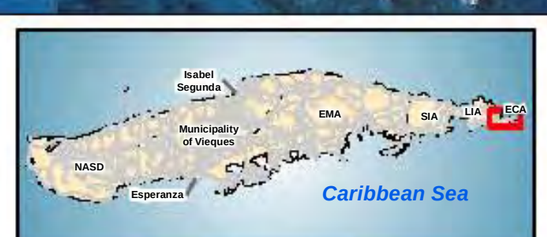
0 200 400
Feet

Figure 4-1
MEC, MD and RRD Recovered During TCRA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_4-2_MEC_Items_Recovered_During_NTCRA.mxd1/4/2012

- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- MD (Scrap)
- RRD (Scrap)
- ECA Boundary

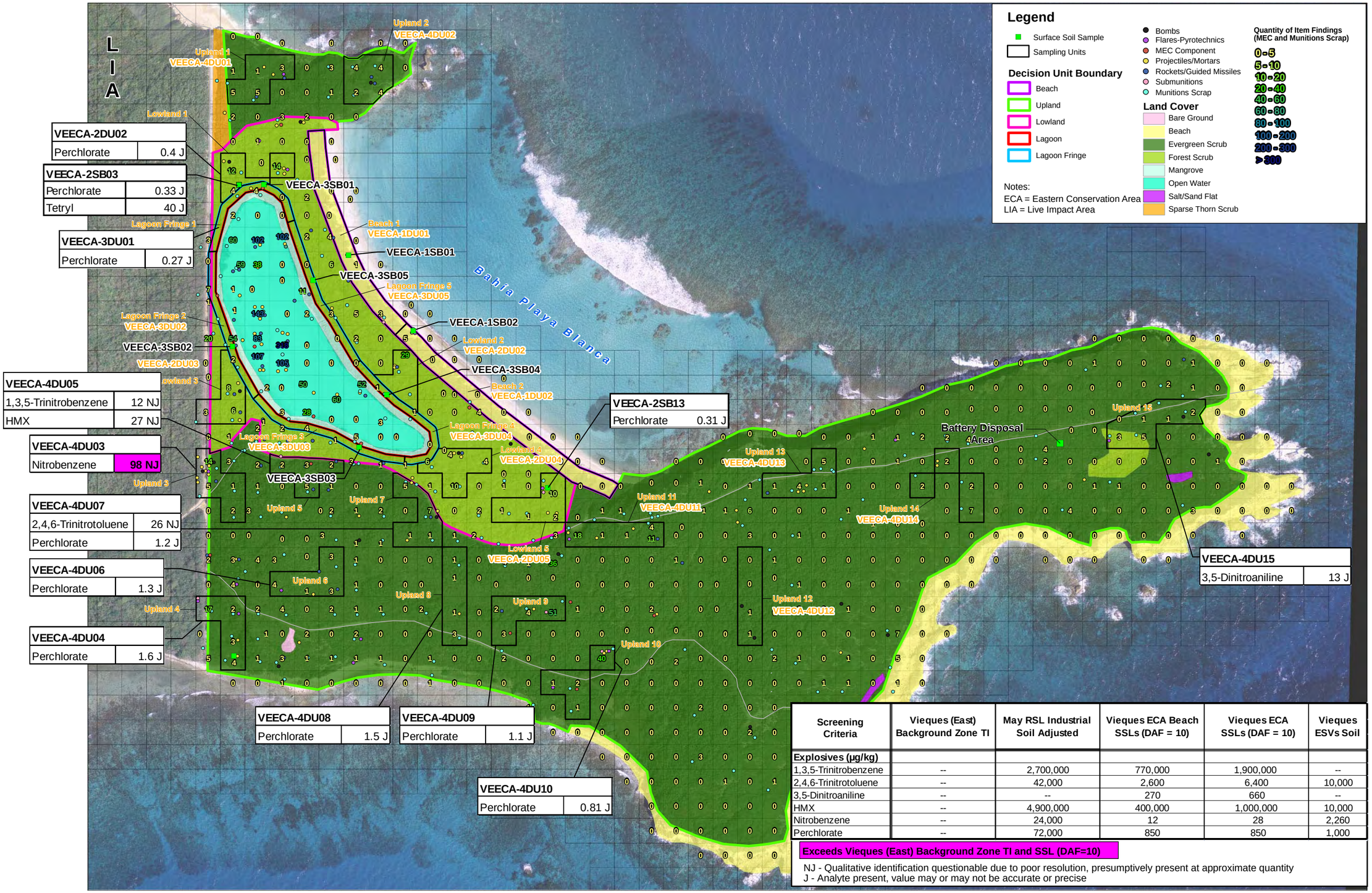


N
W E
S

0 200 400
Feet

Figure 4-2
MEC, MD and RRD Recovered During NTCRA
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



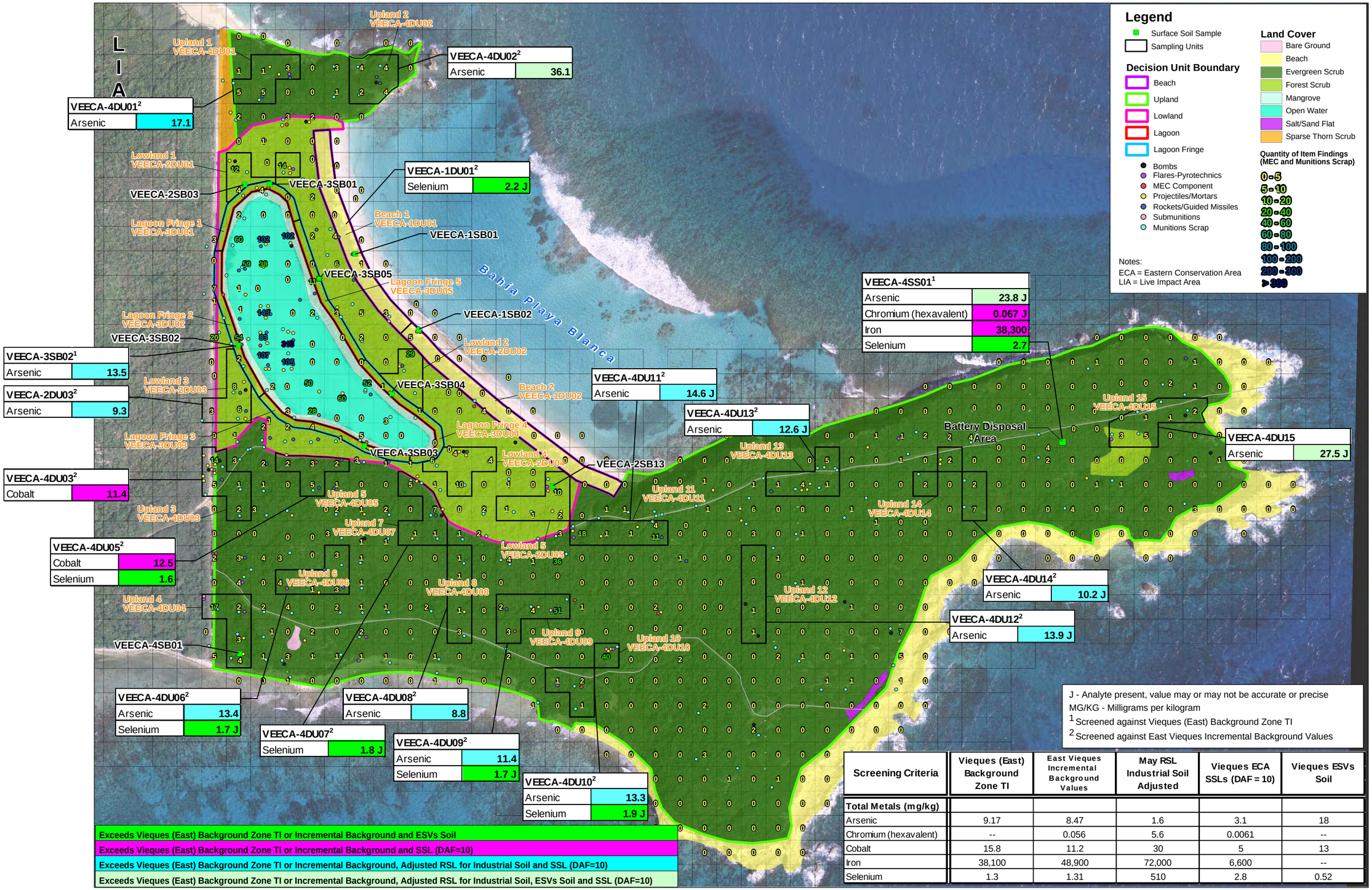
Screening Criteria	Vieques (East) Background Zone TI	May RSL Industrial Soil Adjusted	Vieques ECA Beach SSLs (DAF = 10)	Vieques ECA SSLs (DAF = 10)	Vieques ESVs Soil
Explosives (µg/kg)					
1,3,5-Trinitrobenzene	--	2,700,000	770,000	1,900,000	--
2,4,6-Trinitrotoluene	--	42,000	2,600	6,400	10,000
3,5-Dinitroaniline	--	--	270	660	--
HMX	--	4,900,000	400,000	1,000,000	10,000
Nitrobenzene	--	24,000	12	28	2,260
Perchlorate	--	72,000	850	850	1,000

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
J - Analyte present, value may or may not be accurate or precise

FIGURE 4-3
Explosives Detections and Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

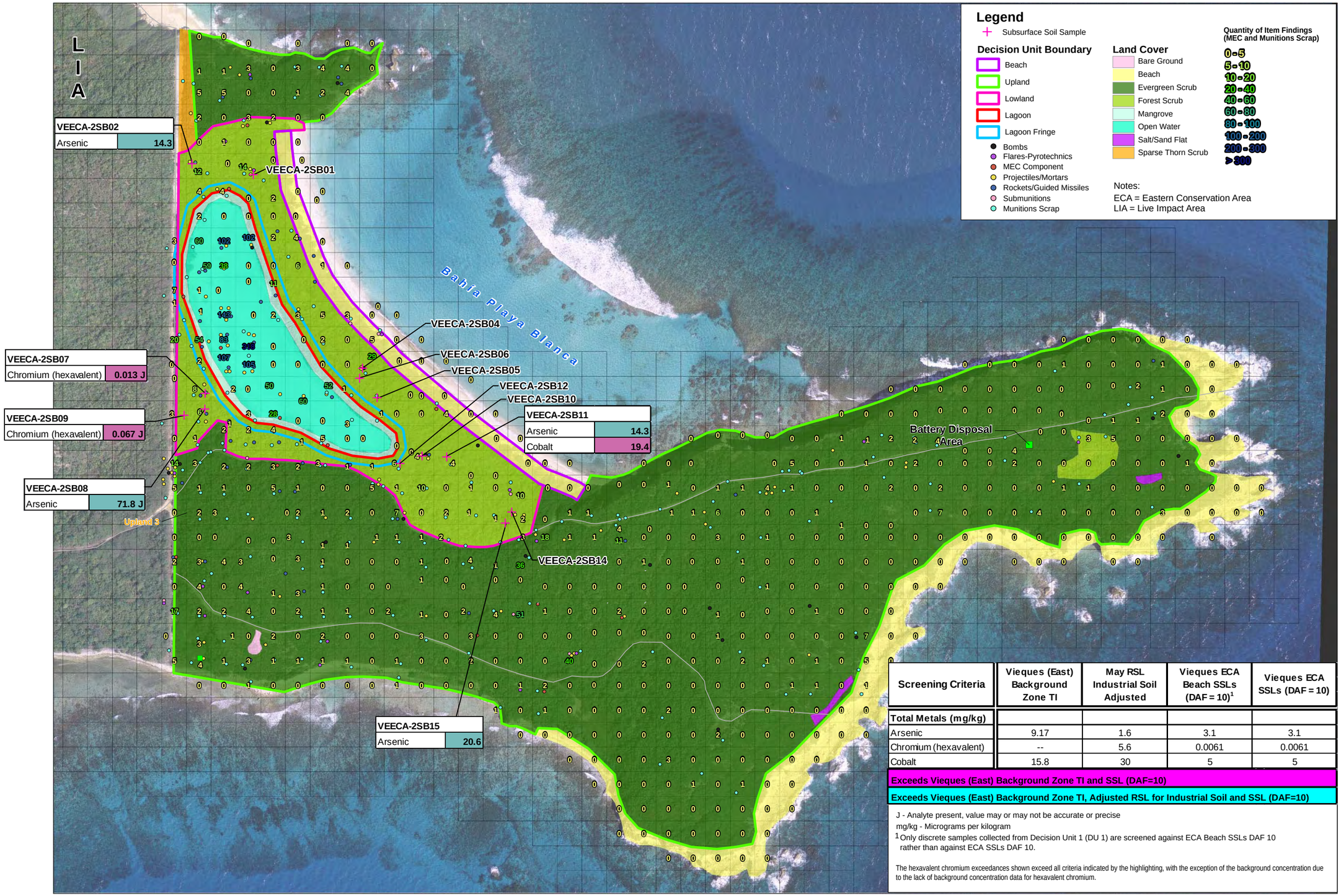
CH2MHILL



Screening Criteria	Vieques (East) Background Zone TI	East Vieques Incremental Background Values	May RSL Industrial Soil Adjusted	Vieques ECA SSLs (DAF = 10)	Vieques ESVs Soil
Total Metals (mg/kg)					
Arsenic	9.17	8.47	1.6	3.1	18
Chromium (hexavalent)	--	0.056	5.6	0.0061	--
Cobalt	15.8	11.2	30	5	13
Iron	38,100	48,900	72,000	6,600	--
Selenium	1.3	1.31	510	2.8	0.52

FIGURE 4-4
Total Metals Exceedances in Surface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



Screening Criteria	Vieques (East) Background Zone TI	May RSL Industrial Soil Adjusted	Vieques ECA Beach SSLs (DAF = 10)[1]	Vieques ECA SSLs (DAF = 10)
Total Metals (mg/kg)				
Arsenic	9.17	1.6	3.1	3.1
Chromium (hexavalent)	--	5.6	0.0061	0.0061
Cobalt	15.8	30	5	5

Exceeds Vieques (East) Background Zone TI and SSL (DAF=10)

Exceeds Vieques (East) Background Zone TI, Adjusted RSL for Industrial Soil and SSL (DAF=10)

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

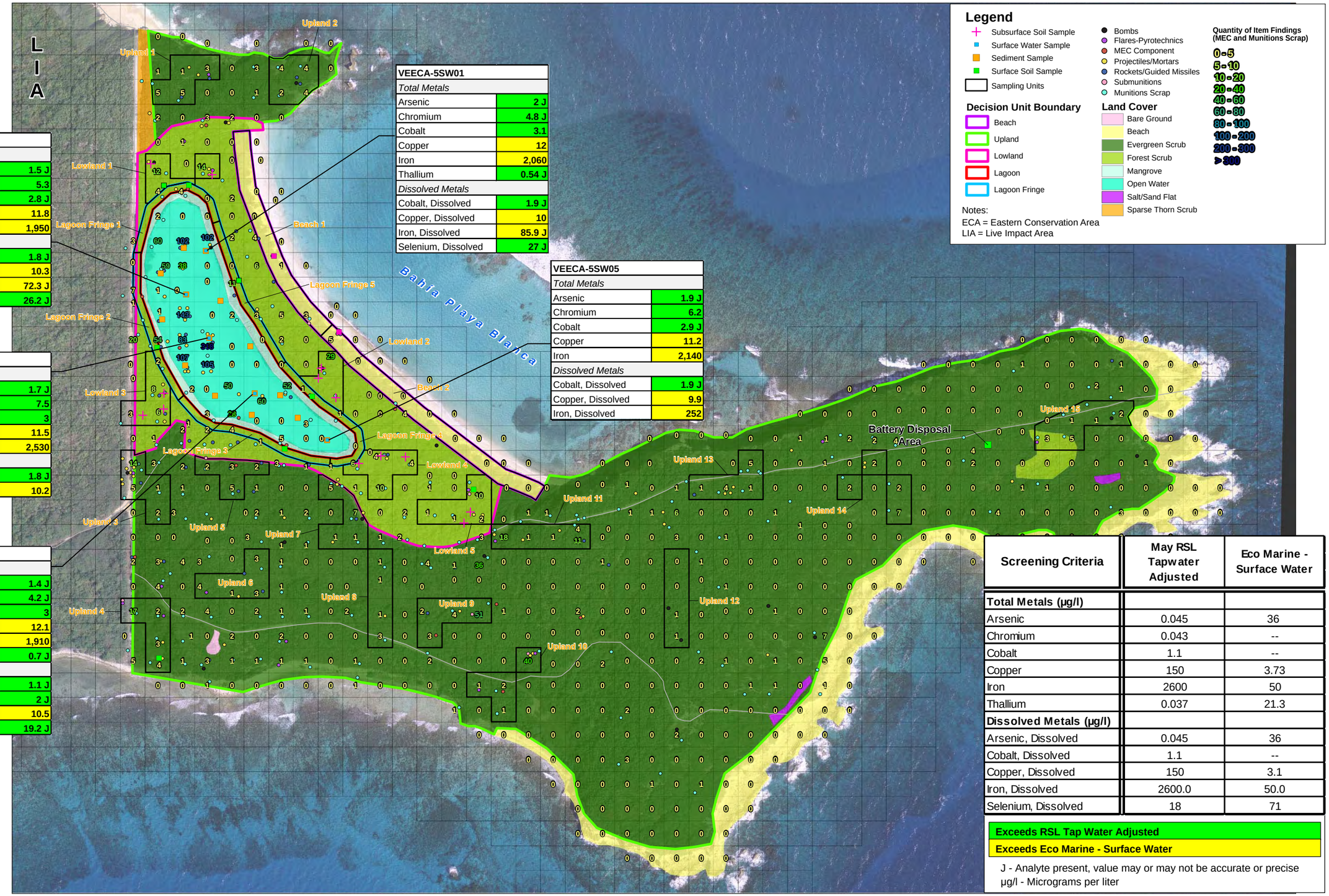
mg/kg - Micrograms per kilogram

[1] Only discrete samples collected from Decision Unit 1 (DU 1) are screened against ECA Beach SSLs DAF 10 rather than against ECA SSLs DAF 10.

The hexavalent chromium exceedances shown exceed all criteria indicated by the highlighting, with the exception of the background concentration due to the lack of background concentration data for hexavalent chromium.

FIGURE 4-5
Total Metals Exceedances in Subsurface Soil
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



VEECA-5SW01	
Total Metals	
Arsenic	2 J
Chromium	4.8 J
Cobalt	3.1
Copper	12
Iron	2,060
Thallium	0.54 J
Dissolved Metals	
Cobalt, Dissolved	1.9 J
Copper, Dissolved	10
Iron, Dissolved	85.9 J
Selenium, Dissolved	27 J

VEECA-5SW02	
Total Metals	
Arsenic	1.5 J
Chromium	5.3
Cobalt	2.8 J
Copper	11.8
Iron	1,950
Dissolved Metals	
Cobalt, Dissolved	1.8 J
Copper, Dissolved	10.3
Iron, Dissolved	72.3 J
Selenium, Dissolved	26.2 J

VEECA-5SW05	
Total Metals	
Arsenic	1.9 J
Chromium	6.2
Cobalt	2.9 J
Copper	11.2
Iron	2,140
Dissolved Metals	
Cobalt, Dissolved	1.9 J
Copper, Dissolved	9.9
Iron, Dissolved	252

VEECA-5SW03	
Total Metals	
Arsenic	1.7 J
Chromium	7.5
Cobalt	3
Copper	11.5
Iron	2,530
Dissolved Metals	
Cobalt, Dissolved	1.8 J
Copper, Dissolved	10.2

VEECA-5SW04	
Total Metals	
Arsenic	1.4 J
Chromium	4.2 J
Cobalt	3
Copper	12.1
Iron	1,910
Thallium	0.7 J
Dissolved Metals	
Arsenic, Dissolved	1.1 J
Cobalt, Dissolved	2 J
Copper, Dissolved	10.5
Selenium, Dissolved	19.2 J

Screening Criteria	May RSL Tapwater Adjusted	Eco Marine - Surface Water
Total Metals (µg/l)		
Arsenic	0.045	36
Chromium	0.043	--
Cobalt	1.1	--
Copper	150	3.73
Iron	2600	50
Thallium	0.037	21.3
Dissolved Metals (µg/l)		
Arsenic, Dissolved	0.045	36
Cobalt, Dissolved	1.1	--
Copper, Dissolved	150	3.1
Iron, Dissolved	2600.0	50.0
Selenium, Dissolved	18	71

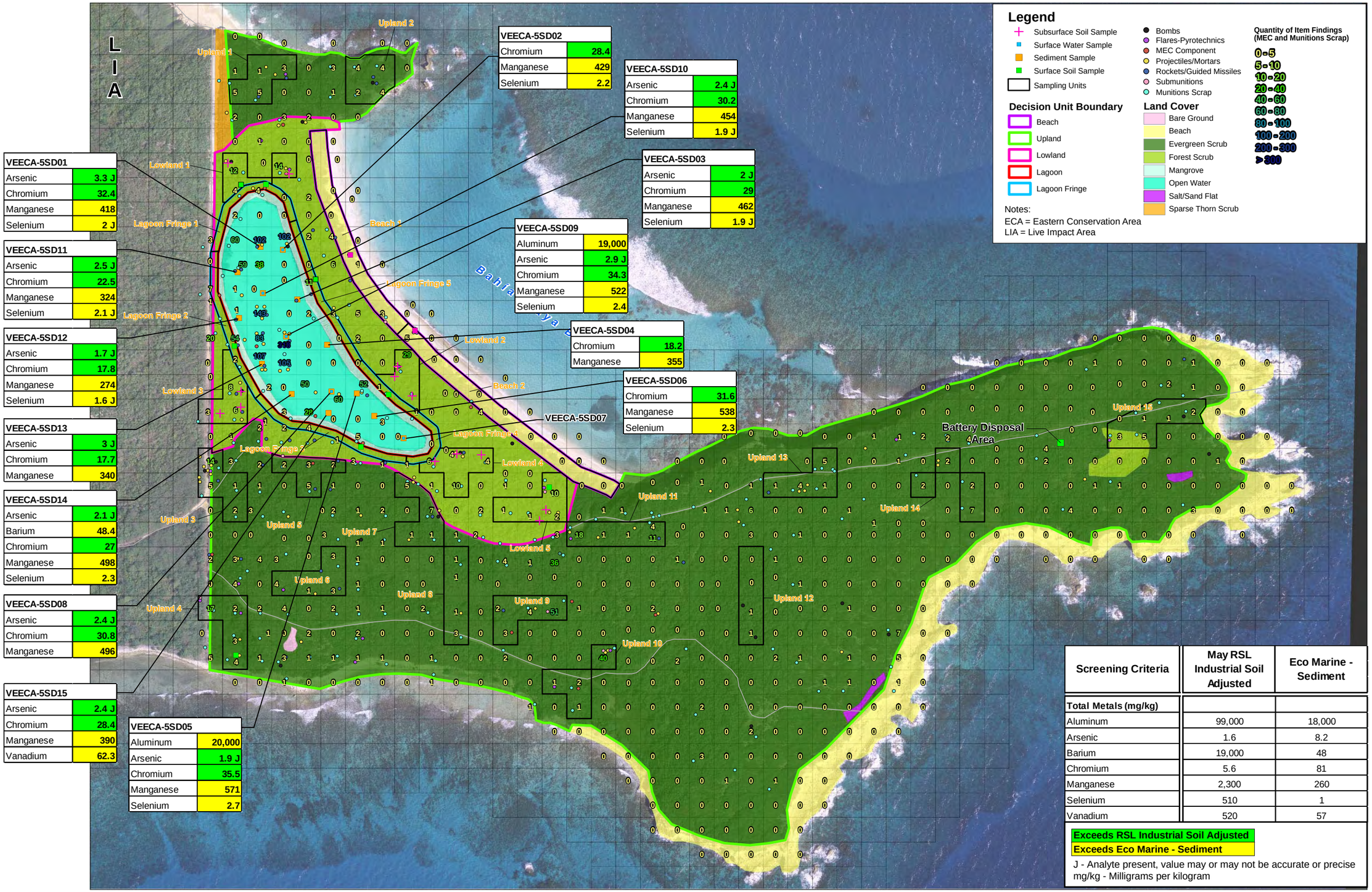
Exceeds RSL Tap Water Adjusted

Exceeds Eco Marine - Surface Water

J - Analyte present, value may or may not be accurate or precise
µg/l - Micrograms per liter

FIGURE 4-6
Total and Dissolved Metals Exceedances in Surface Water
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL



VEECA-5SD01	
Arsenic	3.3 J
Chromium	32.4
Manganese	418
Selenium	2 J

VEECA-5SD11	
Arsenic	2.5 J
Chromium	22.5
Manganese	324
Selenium	2.1 J

VEECA-5SD12	
Arsenic	1.7 J
Chromium	17.8
Manganese	274
Selenium	1.6 J

VEECA-5SD13	
Arsenic	3 J
Chromium	17.7
Manganese	340

VEECA-5SD14	
Arsenic	2.1 J
Barium	48.4
Chromium	27
Manganese	498
Selenium	2.3

VEECA-5SD08	
Arsenic	2.4 J
Chromium	30.8
Manganese	496

VEECA-5SD15	
Arsenic	2.4 J
Chromium	28.4
Manganese	390
Vanadium	62.3

VEECA-5SD05	
Aluminum	20,000
Arsenic	1.9 J
Chromium	35.5
Manganese	571
Selenium	2.7

VEECA-5SD02	
Chromium	28.4
Manganese	429
Selenium	2.2

VEECA-5SD10	
Arsenic	2.4 J
Chromium	30.2
Manganese	454
Selenium	1.9 J

VEECA-5SD03	
Arsenic	2 J
Chromium	29
Manganese	462
Selenium	1.9 J

VEECA-5SD09	
Aluminum	19,000
Arsenic	2.9 J
Chromium	34.3
Manganese	522
Selenium	2.4

VEECA-5SD04	
Chromium	18.2
Manganese	355

VEECA-5SD06	
Chromium	31.6
Manganese	538
Selenium	2.3

Screening Criteria	May RSL Industrial Soil Adjusted	Eco Marine - Sediment
Total Metals (mg/kg)		
Aluminum	99,000	18,000
Arsenic	1.6	8.2
Barium	19,000	48
Chromium	5.6	81
Manganese	2,300	260
Selenium	510	1
Vanadium	520	57

Exceeds RSL Industrial Soil Adjusted
Exceeds Eco Marine - Sediment

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

FIGURE 4-7
Total Metals Exceedances in Sediment
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

SECTION 5

Chemical Fate and Transport

This section discusses the fate and transport of constituents detected in soil, sediment, and surface water at UXO 1 above screening criteria, as discussed in Section 4.2. Fate and transport consists of identification of theoretical chemical phases and migration and degradation pathways. An understanding of the mobility and persistence of a chemical in the subsurface is part of the overall assessment of the potential for that chemical to cause an adverse human health or environmental effect.

This section also includes the conceptual site model (CSM) of the various media at UXO 1 (**Figure 5-1**). The CSM qualitatively combines and interprets the compendium of information presented in this section and earlier sections of the report, including the physical characteristics, contaminant sources, potential migration of contaminants, and the potential receptors and exposure pathways. The CSM is used to support the risk evaluations, risk management decisions, and remedial alternatives evaluation, as applicable.

Chemical groups detected in environmental media at UXO 1 comprise explosives and inorganics, as discussed in Section 4. The specific constituents detected in the various media at UXO 1 are summarized in **Table 5-1**. Chemicals detected above screening criteria, as discussed in Section 4, are summarized in **Table 5-2**. Among the 12 constituents listed in **Table 5-2**, only 6 of them (nitrobenzene, arsenic, chromium, cobalt, iron, and selenium) were identified in soil. The rest were either identified in surface water (copper and thallium) or sediment (aluminum, barium, manganese, and vanadium).

The inorganics listed in **Table 5-2** naturally occur in soil. The common ranges of these inorganics in soil, obtained from literature (Lindsay, 1979), are provided in **Table 5-3**, together with the site-specific soil background concentrations. With the exception of one detection of selenium (2.7 mg/kg in surface soil sample 4SS01), the detected inorganics in soil at the site (**Table 5-3**) are comparable to Vieques background and/or common ranges found in soil (Lindsay, 1979).

It is important to note that all of the inorganic concentrations detected within ECA media are likely attributable to background, as discussed in Section 4.2. However, for the purposes of fate and transport discussion, those that exceeded screening criteria are included herein.

5.1 Chemical Mobility and Persistence

The mobility and persistence of the chemicals at a site are determined by their physical, chemical, and biological interaction with the environment. Mobility is the potential for a chemical to migrate from a site, and persistence is a measure of how long a chemical will remain in the environment. Because physical and chemical properties of a chemical and the environment affect the movement of the chemical in the environment, predicting the behavior and migration of a chemical is complex. Some of the mechanisms controlling mobility and persistence are described below.

5.1.1 Solubility

Solubility is one of the most important contaminant fate and transport properties. Contaminants that are readily soluble in water have greater migration potential and may be more amenable to transformation processes if suitable conditions exist. Highly soluble contaminants are more likely to be leached from soil by precipitation or runoff that infiltrates into the subsurface.

The explosive nitrobenzene has a solubility of 2,090 mg/L. The solubility of inorganics is dependent on several factors. In general, solubility is highly dependent on the oxidation state of the inorganic, which is dependent on subsurface conditions. The solubility of cations decreases as pH increases. Some cations may complex with oxygen and hydroxide, forming insoluble oxyhydroxides, or phosphate, sulfate, and carbonate, forming insoluble mineral precipitates. Metal sulfide complexes, which form in reducing environments, are extremely insoluble and tend to reduce the total inorganics concentrations (USEPA, 1979).

5.1.2 Sorption

Sorption of chemicals onto soil particles results in a slowing (retardation) of chemical movement relative to the rainfall infiltration rate or groundwater flow velocity and an overall reduction in the chemical's concentration. Sorption occurs when a constituent adheres to and becomes associated with solid particles in the formation. The subsurface materials likely to sorb chemicals are clays and organic matter. In addition, some inorganics, such as arsenic species, can sorb to iron and oxyhydroxide or oxide coatings on soil and sediment grains.

The conventional measure of sorption is the soil-water partition coefficient (K_d). The K_d for organic chemicals is determined by multiplying its organic carbon partition coefficient (K_{oc}) by the fraction of organic carbon (f_{oc}) present in soil. K_{oc} values have been measured in the laboratory for many contaminants and are widely published in the literature. The f_{oc} is determined by collecting soil samples and measuring the total organic carbon (TOC) concentration in the laboratory. The TOC concentrations detected in seven surface soil samples collected from UXO 1 ranged from 29,000 mg/kg to 180,000 mg/kg with an average TOC concentration of 86,000 mg/kg. The average f_{oc} present in UXO 1 soil is 0.086 g/g. In general, chemicals with a K_{oc} greater than 10,000 milliliters per gram (mL/g) have high degrees of adsorption and consequentially low mobility, whereas chemicals with a K_{oc} between 100 mL/g and 1,000 mL/g have generally moderate degrees of adsorption and consequentially moderate mobility. Nitrobenzene, the only organic chemical identified at UXO 1 above its SSL, has a K_{oc} value of 226 mL/g and therefore, generally moderate mobility. Given the average f_{oc} of 0.086 g/g present in UXO 1 soil, the estimated site-specific K_d for nitrobenzene is 19.5 mL/g, indicating that nitrobenzene is relatively mobile in soil.

The K_d for inorganics is a complex function of pH, organic content, oxide coatings, and other factors; therefore, K_d cannot be easily estimated by methods other than site-specific testing. Due to the number of factors which impact the K_d values for inorganics, these values range from 0.063 mL/g to greater than 63,000 mL/g (**Table 5-2)**. Generally, inorganic adsorption increases with pH. Inorganics most often sorb to clay minerals, organic matter, and iron and manganese oxyhydroxides. Inorganics may be sorbed on the surface of the soil or fixed to the interior of the soil mineral, where they are unavailable for release to water. After available sorption sites are filled, most inorganics are incorporated into the structures of major mineral precipitates, as coprecipitates.

5.1.3 Volatilization

Volatilization from soil and water can be an important transport and concentration reduction process for organic chemicals. Measures of an organic chemical's tendency to volatilize from water and soil include its vapor pressure and Henry's Law Constant (K_h). Compounds with K_h values higher than 10^{-3} atmosphere-cubic meter per mole (atm-m^3/M) are expected to volatilize readily, whereas those with K_h values lower than 10^{-5} atm-m^3/M are relatively non-volatile. Compounds with K_h values in between these values are expected to be moderately volatile. At a given temperature, the higher the vapor pressure of a compound, the higher the volatility of that compound. Given the K_h value of 2.4×10^{-5} atm-m^3/M, volatilization is not expected to be an important fate and transport process for nitrobenzene present at the site.

Volatilization tends to occur more readily from surface water, sediment, or shallow soil than from deeper soil or groundwater. In groundwater, volatilization can occur only at the air/water interface between the saturated and unsaturated zones, and movement of aqueous-phase contaminants from bulk groundwater to the interface is largely diffusion-limited. In unsaturated shallow soil, the soil gas pressure generally approximates the ambient air pressure. With depth, the soil gas pressure tends to increase and it becomes more difficult for the gas to escape and equalize with the ambient air pressure.

Due to the complexity of inorganics and their variable forms in the environment, no K_h values can be provided. However, inorganics are typically not volatile under normal temperature and pressure conditions.

5.1.4 Transformation

Transformation occurs when the valence state of inorganics is increased (oxidation) or decreased (reduction). It can be caused by changes in E_h (oxidation potential) and/or pH and by microbial or non-microbial (abiotic) processes. Transformation may have a significant effect on the mobility of an inorganic, either increasing or decreasing it.

Aluminum, Iron, and Manganese

The solid form of aluminum (aluminum hydroxides and imogolite), iron (iron hydroxides), and manganese (manganese oxides) are usually present in the natural soil matrix. If sufficient amounts of oxygen and nitrate are not present in the subsurface, iron hydroxides and manganese oxides will be used as electron acceptors by metabolic activity and reductively dissolved into soluble forms. Sulfides present in groundwater can also reductively dissolve iron hydroxides. The soluble form of aluminum can be released to groundwater through either complexation to organic acids or dissolution of aluminum minerals. As the pH of the subsurface decreases, the amount of soluble aluminum is generally increased.

Several inorganics (such as arsenic) have a tendency to sorb to these iron and aluminum hydroxides and manganese oxides. If these compounds are reductively dissolved, then the inorganics which are bound to these hydroxides and oxides will also be released.

Arsenic, Chromium, Selenium, and Vanadium

In oxidizing environments, these constituents primarily exist as oxyanions (hard anions that contain oxygen) and are relatively mobile. However, they can be adsorbed by clays, iron hydroxides, aluminum hydroxides, manganese compounds, and organic material at acidic and neutral pHs.

Arsenic, chromium, and vanadium can be reduced from higher to lower valance states by organic matter, divalent metals, and dissolved sulfide. Under reducing conditions, insoluble arsenic and antimony sulfides are precipitated in the presence of sulfides. Chromium will form insoluble chromium hydroxide or be sorbed by manganese oxides. Selenium will react with inorganic cations to form insoluble inorganic selenides.

Barium

Barium is most often found in inorganic complexes and is likely to precipitate out of solution as an insoluble salt with other common components of the environment, such as carbonate and sulfate. The maximum concentration of barium in groundwater is often limited by the solubility of the mineral barite (Eastern Research Group, Inc. [ERG], 2003).

Cobalt

Cobalt forms insoluble inorganic sulfides in anaerobic environments. It tends to sorb and be transported in water primarily with suspended colloidal particles (ERG, 2003). Soils with higher pH and contents of clay, natural organics, and hydrous manganese and iron oxides bind cobalt to a greater degree; as these factors decrease, the mobility of cobalt increases.

Copper

Copper is highly insoluble in reduced environments, where it precipitates as inorganic sulfides. It is strongly adsorbed by organic matter, iron and manganese oxides, and clays, but complexing of the inorganic to ammonia, chloride, and humic acids can increase its solubility and thus mobility. Copper is insoluble above a pH of 7 to 8 and in the presence of abundant carbonate.

Thallium

The mobility of thallium in water is limited by the low solubility of thallium oxides. It is only soluble in highly reduced environments in the charged ionic form. Thallium is strongly adsorbed by montmorillonite clays and manganese oxides.

5.1.5 Degradation

Degradation is the deterioration or destruction of an organic chemical either biologically (biodegradation) or abiotically through such processes as hydrolysis and photolysis. Biodegradation of chemicals by microbial organisms occurs through metabolic or enzymatic processes. Hydrolysis is the reaction of a chemical with water and photolysis is the result of exposing the chemical to light. The rate of degradation can be expressed as a half life and is dependent on the existing chemical, biological, and physical conditions of the media in which the contaminant is located.

Nitrobenzene can be biodegraded under both aerobic and anaerobic conditions. However, aerobic biodegradation is expected to occur at a faster rate. Nitrobenzene had a half-life of 56 days in an aerobic soil column. It may be degraded in water by photolysis (a half-life of 133 days), by reaction with hydrated electrons in eutrophic lakes (a half-life of 22 days), or by reaction with sunlight and nitrate (a measured half-life of 11 hours). Volatilization from water surfaces is expected to be an important fate process based upon its Henry's Law constant of $2.4X10^{-5}$ atm-m^3/M.

5.1.6 Bioaccumulation

Bioaccumulation is the extent to which a chemical will partition from water into the lipophilic parts (e.g., fat) of an organism. Bioaccumulation commonly is estimated by the octanol-water partition coefficient (K_{ow}). Chemicals with high values of K_{ow} tend to avoid the aqueous phase and remain in soil longer or bioaccumulate in the lipid tissue of exposed organisms. In general, chemicals with a log K_{ow} greater than 3 have a high potential for bioaccumulation, whereas chemicals with a log K_{ow} less than 3 have a low potential for bioaccumulation. As listed in **Table 5-2,** nitrobenzene has a log K_{ow} (1.85) less than 3, indicating a low potential for bioaccumulation.

5.2 Chemical Migration

This subsection discusses the site-specific sources and potential mechanisms for chemical release and migration from these sources. **Figure 5-1** presents the Conceptual Site Model (CSM) for UXO 1 and supports the discussion in this subsection.

5.2.1 Potential Sources of Contamination

Munitions and explosives, most likely from munitions directed toward the LIA that missed their intended target during naval gunfire and air-to-ground training activities, are the potential source of contamination at UXO 1. Chemical contaminants had the potential to be released to environmental media from historical detonations and from the deterioration of MEC and other munitions-related material.

5.2.2 Migration from Potential Source Areas

The migration pathways at UXO 1 were assessed by identifying the extent of the chemicals, incorporating the physical characteristics of the site. A generalized description of the potential contaminant migration pathways are discussed below.

Migration from Ground Surface to Atmosphere

Wind erosion is a potential mechanism for release of the chemicals to the atmosphere from soil, but this mode of transport is inhibited by vegetation or where bedrock is exposed at the surface. The potential for the migration of nitrobenzene vapor (as well as the other explosives detected) into the atmosphere to be of concern is negligible as the chemical has a low tendency to volatilize and it was observed at a low concentration in soil.

Migration via Surface Runoff

Surface runoff could potentially erode soil and deposit chemicals adhering to the soil within surrounding areas, as directed by the ground topography. The low-lying ECA Lagoon acts as a depositional environment for eroded soils. However, contaminant transport potential by runoff is minimal at the site based on the general absence of widespread contamination and the low concentrations of contaminants infrequently detected. Nitrobenzene, as well as the other explosives, were detected in only one to several soil samples, and were not detected in any surface water or sediment samples. Concentrations of inorganics detected in soil, surface water, and sediment samples are likely attributable to normal (and potentially localized) variations of background concentrations, as discussed in Section 4.2 and shown in **Table 5-3**.

Migration from Soil to Groundwater

Only one detection of one explosive in soil (both surface and subsurface) across the entire site was above its SSL. The explosive nitrobenzene was detected in a surface soil sample at an estimated concentration (98 NJ μg/kg), above the SSL (12 μg/kg). However, this explosive was not detected in any subsurface soil samples. Further, there were only three detections of explosives in subsurface soil (two perchlorate and one tetryl), all of which were orders of magnitude below the SSL.

The inorganic chemicals have low mobility in the site soil and are expected to have low potential to leach to groundwater with the infiltration water in the future as the site soil has high organic and clay content. As noted in Section 4.2, the concentrations of inorganics detected at the site, regardless of their relationship to screening criteria, are likely attributable to normal variations in background (**Table 5-3**).

Based on the above information, the potential for migration of contaminants from soil to groundwater at the ECA is negligible.

5.2.3 Potential Exposure and Receptor Pathways

Based on actual and future potential receptors at UXO 1, the potential exposure media at UXO 1 are soil, surface water, and sediment in the lagoon. Groundwater is not currently used, nor will it likely be used in the future. Exposure at UXO 1 may occur under current and actual/theoretical future land use scenarios. Receptors and exposure pathways are discussed in more detail in the human health and ecological risk assessments in Sections 7 and 8, respectively.

TABLE 5-1
Detected Chemicals by Media
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Chemical Name	Media			
	Surface Soil	Subsurface Soil	Surface Water	Sediment
Explosive				
1,3,5-Trinitrobenzene	X			
2,4,6-Trinitrotoluene	X			
3,5-Dinitroaniline	X			
HMX	X			
Nitrobenzene	X			
Perchlorate	X			
Tetryl	X			
Metal				
Aluminum	X	X	X	X
Antimony	X			
Arsenic	X	X	X	X
Barium	X	X	X	X
Beryllium	X	X		X
Cadmium	X	X		X
Calcium	X	X	X	X
Chromium	X	X	X	X
Chromium (hexavalent)	X	X		X
Cobalt	X	X	X	X
Copper	X	X	X	X
Iron	X	X	X	X
Lead	X	X		
Magnesium	X	X	X	X
Manganese	X	X	X	X
Nickel	X	X	X	X
Potassium	X	X	X	X
Selenium	X	X	X	X
Silver	X			
Sodium	X	X	X	X
Thallium	X	X	X	X
Vanadium	X	X	X	X
Zinc	X	X		X

TABLE 5-2

Physical and Chemical Data of Constituents Detected above Screening Criteria

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Constituent	Molecular Weight (g/mole)	Density (g/cm^3)	Water Solubility (mg/L)	Vapor Presure (mm Hg)	K_h ($atm\text{-}m^3/mole$)	K_{oc}	K_d (mL/g)	Log K_{ow}
Explosive								
Nitrobenzene	123.11	1.2037	2090	0.245	0.000024	226.4	19.5	1.85
Metal								
Aluminum	26.98	2.7	U	U	U	NA	NA	U
Arsenic	74.92	5.75	U	U	U	NA	2.0 - 20,000	U
Barium	137.33	3.62	U	U	U	NA	5.0 - 2,500	U
Chromium (III)	52.00	5.22	U	U	U	NA	10 - 50,000	U
Chromium (VI)	52.00	7.14	U	U	U	NA	0.20 - 2,000	U
Cobalt	58.93	8.86	U	U	U	NA	0.063 - 12,600	U
Copper	63.55	8.96	U	U	U	NA	1.3 - 4,000	U
Iron	55.85	7.87	U	U	U	NA	1.4 - 10,000	U
Manganese	54.94	7.3	U	U	U	NA	NA	U
Selenium	78.96	4.81	U	U	U	NA	0.5 - 250	U
Thallium	204.38	11.8	U	U	U	NA	1,000 - 3,200	U
Vanadium	50.94	6	U	U	U	NA	12.6 - 500	U

Notes:

foc = fraction organic carbon = 0.0025 (average of total organic carbon subsurface soil data)

K_d = Soil-Water partition coefficient = K_{oc} x foc for organics

K_h= Henry's Law Constant

K_{oc} = Organic carbon partition coefficient

K_{ow} = Octanol-water partition coefficient

NA = no information available

U = No value is provided because of the uncertainty in the form of these chemicals in the environment.

Data Sources (Sources 1 and 3 are primary references):

(1) United States Environmental Protection Agency. 2011. *Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table June 2011.*

(2) Dragun, James. 1998. *The Soil Chemistry of Hazardous Materials 2nd Edition*.

(3) United States Environmental Protection Agency. 2005. *Partition Coefficients for Metals in Surface Water, Soil, and Waste.*

(4) United States National Library of Medicine. 2009. Hazardous Substances Data Bank (HSDB). *http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB*

TABLE 5-3
Occurrence of Inorganics in Natural Soils
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Inorganic	UXO 1 Incremental Soil Concentration Range (mg/kg)	Incremental Background Concentration (mg/kg)	UXO 1 Discrete Soil Concentration Range (mg/kg)	East Vieques Discrete Background Concentration, Zone TI[1] (mg/kg)	Common Range for Soils[2] (mg/kg)
Aluminum	535 - 33,900	58,200	258 - 37,100	35,000	10,000 - 300,000
Arsenic	1.9 - 36.1	8.47	3.9 - 23.8	9.17	1 - 50
Barium	7 - 73.2	120	4.3 - 44.2	212	100 - 3,000
Chromium	6.2 - 59.4	79.4	4.7 - 65.9	70.1	1 - 1,000
Cobalt	1.5 - 12.5	11.2	0.36 - 9.1	15.8	1 - 40
Copper	1.1 - 24.8	24.6	0.45 - 20.3	94.2	2 - 100
Iron	752 - 38,000	48,900	483 - 38,300	38,100	7,000 - 550,000
Manganese	27.9 - 838	1,040	19.5 - 646	1,630	20 - 3,000
Selenium	0.5 - 1.9	1.31	0.29 - 2.7	1.3	0.1 - 2
Thallium	ND	ND	0.056 - 0.27	0.13	NA
Vanadium	3.9 - 71.4	71.7	2.6 - 66.7	55.7	20 - 500

Note:
NA - Not available
ND - No detections
1) The East Vieques discrete background surface soil (0 to 6-inches bgs) and subsurface soil (6-inches to 2 feet bgs) sample inorganic constituent concentrations in Zone TI are the same.
2) The source of data is from Table 1-1 of "Chemical Equilibria In Soils" (Lindsay, 1979)

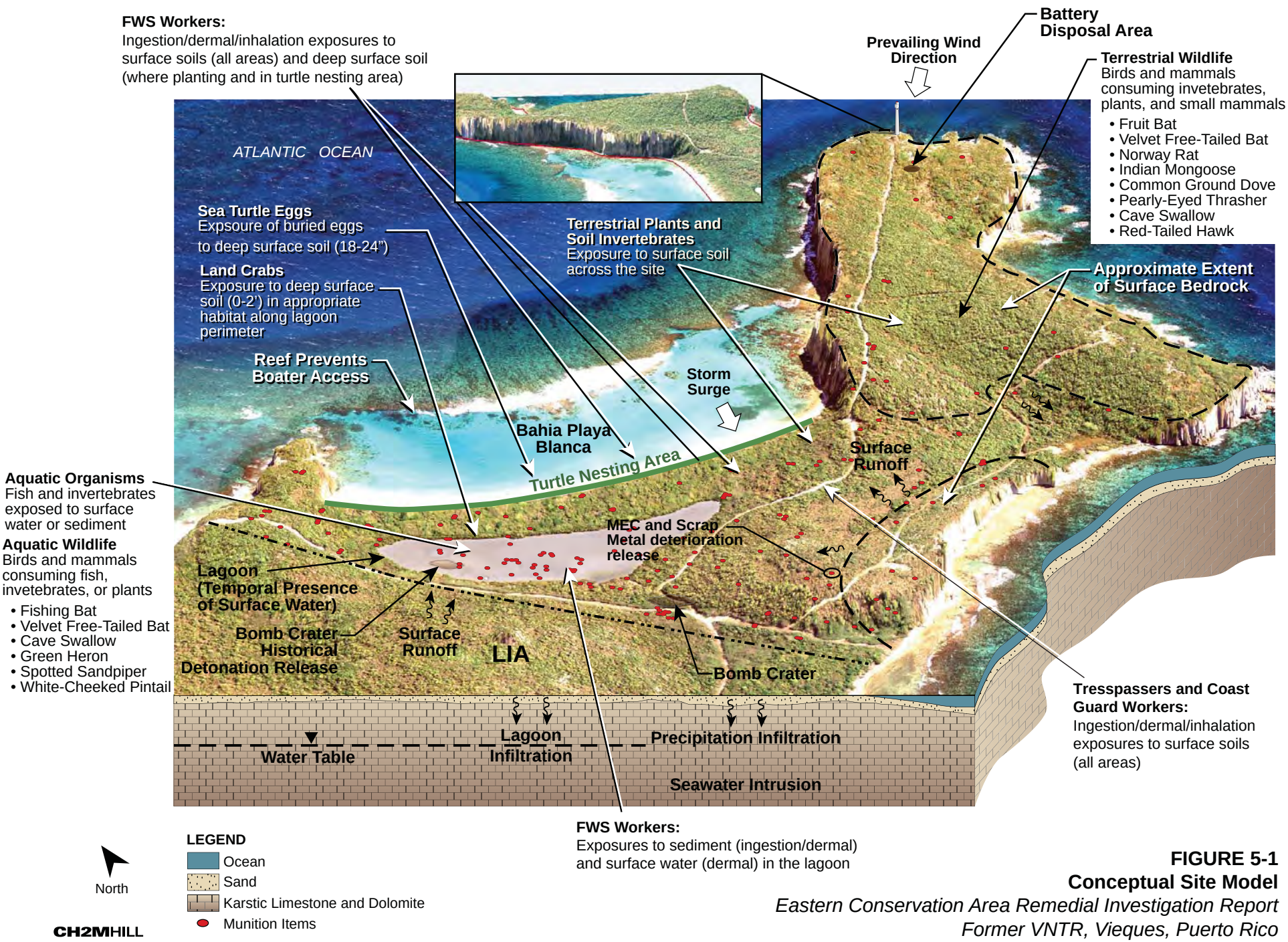


FIGURE 5-1
Conceptual Site Model
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

ES060211161657TPA F5-1-ECA Conceptual Site Model-rev9.ai mstuart

SECTION 6

MEC Explosive Risk Evaluation

This section presents the MEC explosive risk evaluation for UXO 1 based on the results of the TCRA and NTCRA and the source, nature, and extent of MEC. In addition, proposed future land use was considered during development of this risk evaluation.

6.1 Background

MEC explosive risk evaluations may vary in both detail and extent to which qualitative and quantitative inputs are used. The characteristics of the MEC explosive risk evaluation depend on the complexity and particular circumstances of the site. The MEC explosive risk evaluation considers the potential explosive risks associated with current land use and activities, as well as reasonably anticipated future land use.

The purpose of the MEC explosive risk evaluation was to evaluate current and future explosive safety risk caused by the potential presence of MEC at UXO 1 in the absence of any further actions to control or mitigate this potential presence. In addition, the MEC explosive risk evaluation is used to communicate the magnitude of the explosive risk at the site and the primary causes of that risk, and to aid in the development, evaluation, and selection of appropriate response alternatives, as warranted. The MEC explosive risk evaluation is based on current site conditions and does take into account the MEC already removed from the surface across the site, as well as from the subsurface along roads and beaches as part of the TCRA and NTCRA.

For the current and future land use, UXO 1 is part of the National Wildlife Refuge for which no public access is intended; however, limited work by USFWS and US Coast Guard may be conducted. As stated in the RI SAP (CH2M HILL, 2011a), trespassing is not expected at UXO 1 because of the inaccessible nature of the site. Access by sea is unlikely due to the presence of coral barriers and steep cliffs, and access by land is unlikely because the trespassers would have to cross through the LIA, which is a Congressionally-designated Wilderness Area that precludes public access. In addition, roads leading to UXO 1 have locked gates.

6.2 Explosive Safety Hazards

The consequences of a military munitions detonation is associated with physical forces resulting from blast pressure, fragmentation hazards, thermal hazards, and shock hazards. Different types of military munitions vary in their likelihood of detonation and their potential for harm. The classification of energetic materials used in military munitions can be divided by their primary uses: explosives, propellants, and pyrotechnics (USEPA, 2002b).

Although UXO 1 did not contain any targets used during the training activities at the former VNTR, munitions consistent with the use of the former LIA as a target area are present within UXO 1, as evidenced by the results of the TCRA and NTCRA. Munitions were not known to have been intentionally fired at or dropped in the UXO 1 area, but instead were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA. Regardless, a wide variety of high explosive, low explosive, and incendiary material has been recovered from the surface and subsurface at the site.

SECTION 7

Human Health Risk Assessment Summary

A baseline HHRA was conducted for UXO 1. The HHRA evaluated potential current and future health risks from exposure to site media potentially affected by former site operations. The approach, methods, and assumptions used for this HHRA were based upon the final HHRA protocol presented in the Master Standard Operating Procedures, Protocols, and Plans for the Environmental Restoration Program, Vieques, Puerto Rico (CH2M HILL, 2010a); the HHRA pre-interim deliverable for UXO 1 (CH2M HILL, 2011b); the HHRA interim deliverable for UXO 1 (CH2M HILL, 2011c), and the regulatory comments on the pre-interim and interim deliverables. The protocol is consistent with EPA Region II policy and EPA guidance, primarily: *Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual, Parts A, D, E, and F* (USEPA, 1989, 2001, 2004, 2009a and 2009b) and *Human Health Evaluation Manual, Standard Default Exposure Factors* (USEPA, 1991). The complete HHRA is presented in **Appendix K** of this RI Report. This section summarizes the key components and findings of the HHRA.

7.1 Potential Receptors and Chemicals of Potential Concern

In accordance with the RI SAP (CH2M HILL, 2011a), the following receptors were evaluated in the HHRA:

Current/Future USFWS Workers – USFWS Workers were quantitatively evaluated for potential exposures to site-related constituents based on their anticipated work activities and exposure areas. The following five exposure scenarios were identified for USFWS Workers and were quantitatively evaluated in the HHRA.

- FWS Worker #1 – Current/future USFWS workers who engage in site-wide wildlife surveillance and monitoring (e.g., migratory water fowl)
- FWS Worker #2 – Current/future USFWS workers who engage in sea turtle monitoring and conservation activities at Bahia Playa Blanca Beach only.
- FWS Worker #3 – Future USFWS upland dry forest restoration workers who conduct restoration, surveillance and monitoring of the Uplands only.
- FWS Worker #4 – Future USFWS lowland forest restoration workers who conduct restoration, surveillance and monitoring of the Lowlands only.
- FWS Worker #5 - Future USFWS workers who engage in wildlife surveillance and monitoring (e.g., migratory water fowl) at the lagoon fringe only.

Potential current/future trespassers, Coast Guard workers, and USFWS law enforcement workers were qualitatively evaluated in the HHRA because of the low frequency of current or potential future exposure, as indicated in the RI SAP (CH2M HILL, 2011a). For these potential exposures, the risk estimates for USFWS workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of potential risks.

Soil, sediment, and surface water samples collected in February 2011 during the RI were used in the HHRA. The soil dataset consists of 11 discrete soil samples collected from the 0-2 feet interval and 27 incremental samples collected from the 0-2 inch interval.

Soil data were divided into five sample groupings based on potential exposure scenarios at the site. Consistent with Attachment C of the RI SAP (CH2M HILL, 2011a), surface soil data were collected at four Decision Units; subsurface exposures were not addressed in the HHRA since subsurface soil is not present everywhere and subsurface activities by USFWS workers occur and/or will likely occur at too a low frequency to be considered quantitatively. The Decision Units and number of samples in each unit used in the HHRA are:

- Bahia Playa Blanca Beach: 2 discrete (1.5 to 2 feet) and 2 incremental (0 to 2 inches) surface soil samples.
- Upland: 2 discrete (2 inches to 1.5 feet) and 15 incremental (0 to 2 inches) surface soil samples.
- Lowland: 2 discrete (2 inches to 1 foot) and 5 incremental (0 to 2 inches) surface soil samples.

- Lagoon Fringe: 5 discrete (2 inches to 2 feet) and 5 incremental (0 to 2 inches) surface soil samples.

In addition to the four soil Decision Units, a site-wide surface soil data grouping was assessed for potential soil exposures, consistent with **Appendix C** of the SAP (CH2M HILL, 2011a):

- Site-Wide: 9 discrete (2 inches to 1 foot, 2 inches to 1.5 feet, and 2 inches to 2 feet, excluding the Bahia Playa Blanca Beach discrete samples from deeper surface soil because these soils would only be encountered during specific Beach decision unit activities [i.e., turtle nesting monitoring]) and 27 incremental (0 to 2 inches) surface soil samples.

The sediment and surface water datasets consist of 15 and 5 samples, respectively, collected from the ECA Lagoon. Sampling locations for soil, sediment, and surface water samples are depicted on **Figures 2 and 3** in **Attachment K-2 (Appendix K)**. **Tables 1 and 2** of **Attachment K-2 (Appendix K)** depict the assignment of samples to each data grouping used in the HHRA.

COPCs were identified for soil using the screening process presented in the Vieques Master HHRA protocol (CH2M HILL, 2010a). The conceptual site model in **Figure 1** of **Attachment K-2 (Appendix K)** presents the receptor groups that were evaluated in the HHRA. The following COPCs were identified for the indicated receptors and data groupings:

- USFWS Worker #1 – One inorganic (arsenic) was identified as a COPC in site-wide surface soil. One inorganic (arsenic) was identified as a COPC in Lagoon sediment. Three inorganics (arsenic, cobalt, thallium) were identified as COPCs in Lagoon surface water.
- USFWS Worker #2 – One inorganic (arsenic) was identified as a COPC in Bahia Playa Blanca Beach surface soil.
- USFWS Worker #3 – One inorganic (arsenic) was identified as a COPC in Upland surface soil.
- USFWS Worker #4 – One inorganic (arsenic) was identified as a COPC in Lowland surface soil.
- USFWS Worker #5 – One inorganic (arsenic) was identified as a COPC in Lagoon sediment. Three inorganics (arsenic, cobalt, thallium) were identified as COPCs in Lagoon surface water. One inorganic (arsenic) was identified as a COPC in Lagoon Fringe surface soil.

7.2 Exposure Evaluation

Potential current and future receptors were evaluated in the HHRA. As noted in Section 7.1 and in the conceptual model for potential human receptors (**Figure 1** of **Attachment K-2 (Appendix K)**), current/future receptors quantified in the HHRA consist of FWS workers. The following potential exposure pathways were quantified for potential receptors identified at ECA.

- Current/Future USFWS Workers #1– Ingestion, dermal contact, and inhalation exposure to COPCs in site-wide surface soil (0-2 feet), ingestion and dermal contact to COPCs in lagoon sediment, and dermal contact to COPCs in lagoon surface water.
- Current/Future USFWS Workers #2– Ingestion, dermal contact, and inhalation exposure to COPCs in Bahia Playa Blanca Beach surface and deeper surface soil (0-2 feet).
- Future USFWS Workers #3– Ingestion, dermal contact, and inhalation exposure to COPCs in Uplands surface soil (0-1.5 feet).
- Future USFWS Workers #4– Ingestion, dermal contact, and inhalation exposure to COPCs in Lowlands surface soil (0-1 foot).
- Future USFWS Workers #5– Ingestion, dermal contact, and inhalation exposure to COPCs in Lagoon fringe surface soil (0-2 feet), ingestion and dermal contact of COPCs in lagoon sediment, and dermal contact of COPCs in lagoon surface water.

7.3 Risk Estimates

EPA's target range for excess lifetime cancer risk (ELCR) associated with CERCLA sites is 1-in-10,000 ($1x10^{-4}$) to 1-in-1,000,000 ($1x10^{-6}$). Similarly, the target non-cancer hazard index (HI) is 1.0 or less. Risk estimates were calculated for potential receptors and exposure pathways using conservative assumptions for exposure factors and exposure point concentrations. The risk estimates are summarized below:

- **USFWS Worker #1 – Current/Future Scenario**
  - Site-wide surface soil, sediment, and surface water – $1x10^{-6}$ cumulative ELCR and all target organ-specific HIs<1.0
- **USFWS Worker #2 – Current/Future Scenario**
  - Bahia Playa Blanca surface soil - $5x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0
- **USFWS Worker #3 – Future Scenario**
  - Uplands surface soil - $1x10^{-6}$ cumulative ELCR and all target organ-specific HIs<1.0
- **USFWS Worker #4 – Future Scenario**
  - Lowlands surface soil - $3x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0
- **USFWS Worker #5 – Future Scenario**
  - Lagoon fringe surface soil, sediment, surface water - $9x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0

7.4 Chemicals of Concern

In general, COCs are identified where potential site-related ELCRs or HIs for an environmental medium/receptor group combination exceed EPA threshold values (a total ELCR of $1x10^{-4}$ and a target organ-specific HI of 1.0). When a potential site-related ELCR of $1x10^{-4}$ is exceeded for an exposure medium for a receptor group, the COPCs posing an individual ELCR greater than $1x10^{-6}$ in the environmental medium responsible for the unacceptable risks are identified as COCs. When a potential site-related target organ-specific HI exceeds 1.0 for an exposure medium for a receptor group, the COPCs posing a hazard quotient (HQ) greater than 0.10 for that target organ in the environmental medium responsible for the unacceptable risk are identified as COCs.

No COCs were identified for site soil, sediment, or surface water at UXO 1 for the exposure scenarios evaluated in the HHRA because no ELCRs higher than $1x10^{-6}$ or HIs of 1 or higher were determined.

SECTION 8

Ecological Risk Assessment Summary

A screening ecological risk assessment (SERA), constituting Steps 1 and 2 of the ecological risk assessment (ERA) process, and the first step (Step 3A) of a baseline ecological risk assessment (BERA), were conducted for UXO 1. The ERA was conducted to evaluate the potential for adverse effects to the environment at UXO 1. The complete ERA is presented in **Appendix L** of this RI Report. This section summarizes the key components and findings of the ERA.

8.1 ERA Process and Objectives

The approach, methods, and assumptions used for this ERA were based upon the final ERA protocol presented in the *Master Standard Operating Procedures, Protocols, and Plans* (CH2M HILL, 2010a), the *Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration Program – Update 1 (Addendum)* (CH2M HILL, 2010d), the ERA interim deliverable for UXO 1 (CH2M HILL, 2011d), and the regulator comments on the interim deliverable. The ERA was conducted in accordance with the *Navy Policy for Conducting Ecological Risk Assessments* (CNO, 1999) and the Navy guidance for implementing this ERA policy (NAVFAC, 2003). These guidance documents describe a process consisting of eight steps, of which Steps 1 through 3A were conducted for this ERA. Steps 1 and 2 of the ERA process comprise the SERA, which are conducted using intentionally conservative assumptions. If the results of the SERA indicate that unacceptable risks are possible, the site normally continues on to Step 3A, the first step in the BERA.

The objectives of a SERA are to:

- Determine if potential risks to ecological receptors warrant either: (1) additional assessment beyond the conservative screening steps of the ERA process (i.e., unacceptable ecological risks are possible); or (2) the removal of the site from further ecological consideration (i.e., no unacceptable ecological risks likely).
- Focus subsequent steps of the ERA process on the specific chemicals, pathways, and receptors of potential concern if unacceptable ecological risks are possible.
- Identify any data gaps or areas of unacceptable uncertainty that may require the collection of additional data to support ERA evaluations beyond the screening level.

The general objectives of a Step 3A ERA are to:

- Refine the risk estimates from the SERA to determine if risks to ecological receptors from site-related chemicals are likely to be unacceptable based upon realistic exposure scenarios.
- Focus subsequent data collection activities if potentially unacceptable risks are indicated, uncertainties are unacceptably high, and/or data gaps are identified.

8.2 Ecological Setting

The ecological setting is described in Section 3.2 of this report and **Appendix L**.

8.3 Analytical Data Used in the ERA

Environmental media samples evaluated in the UXO 1 ERA are listed in **Appendix L, Table L-5**, and their locations are shown on **Appendix L, Figure L-1**. The analytical data sets for these samples are included in **Appendix J**, including ECA Lagoon surface water (discrete), ECA Lagoon sediment (discrete), site-wide incremental surface soil, Lagoon Fringe deeper surface soil (discrete), Beach deeper surface soil (discrete), and Upland deeper surface soil (discrete). Background incremental soil samples are also included in **Appendix L, Table L-5**. The incremental background technical memorandum is included as **Appendix M**.

The ECA Lagoon is represented by samples collected from 5 marine surface water and 15 marine sediment stations. Incremental soil sampling (0 – 2 inches) was conducted at the four terrestrial decision units for a total of 27 samples. At the Lagoon Fringe decision unit, discrete deeper surface soil samples (2 - up to 24 inches) were collected from 5

stations. At the Beach decision unit, discrete deeper surface soil samples (18 – 24 inches) were collected from 2 stations. At the Upland decision unit, one discrete deeper surface soil sample (2 – 18 inches) was collected from 1 station to evaluate potential exposures for the land crab, based upon the identification of land crab activity in this area.

8.4 ERA Results

This section summarizes the ERA results. A more detailed description of the ERA results is provided in **Appendix L**.

8.4.1 Terrestrial Habitats

Eleven assessment endpoints were developed for terrestrial habitats at UXO 1. Lines of evidence for terrestrial habitats included: (1) comparison of surface soil concentrations with ecological screening values (ESVs); (2) comparison of modeled dietary doses with ingestion toxicity reference values (TRVs); and (3) comparison of site surface soil concentrations with background concentrations.

One inorganic (selenium) was identified as a Step 3A COPC in surface soil based upon the incremental soil data. Selenium was detected in 19 of 27 site surface soil samples, but was above background in just 6 of these samples, with a maximum ratio of 1.68. As discussed in Section 4.2.1, selenium at UXO 1 is likely naturally occurring and related to its association with iron oxides; this inorganic is also not a significant component of munitions. Thus, selenium was not identified as an ecological COC.

Two explosives (1,3,5-trinitrobenzene and 3,5-dinitroaniline) were detected in surface soil samples but could not be evaluated quantitatively because soil ESVs were not available. However, the maximum concentrations of these two explosives (12.0 and 13.0 µg/kg, respectively) were orders of magnitude less than soil ESVs for other explosives (ranging from 2,260 to 80,000 µg/kg). In addition, each explosive was detected in only one sample and thus meets the frequency of detection criteria for exclusion. Thus, neither of these explosives was identified as an ecological COC.

No chemicals were identified as COPCs for further risk evaluation in the Lagoon Fringe, Beach, or Upland decision units based upon the deeper discrete surface soil samples.

The results of the terrestrial food web evaluation identified antimony as a COPC. However, because antimony was not detected in any incremental surface soil sample, this identification is based upon the antimony reporting limits. Although no background incremental upper tolerance limit (UTL) was available for antimony, the background discrete UTL from the East Vieques soil background study (5.80 mg/kg) was greater than the UXO 1 mean antimony surface soil concentration (5.00 mg/kg, the mean of one-half of the detection limits for the incremental soil samples). Thus, it is likely that antimony, if actually present in site soils, is at or below background levels; therefore, antimony was not identified as a COC.

In conclusion, no unacceptable risks were identified for terrestrial receptors associated with UXO 1.

8.4.2 Aquatic Habitats (ECA Lagoon)

Nine assessment endpoints were developed for aquatic habitats at the ECA Lagoon. Lines of evidence for aquatic habitats included: (1) comparison of surface water and sediment concentrations with ESVs; (2) comparison of modeled dietary doses with ingestion TRVs; and (3) evaluation of soil concentrations for surface water and sediment COPCs.

In surface water, two inorganics (copper and iron) were identified as Step 3A COPCs in the ECA Lagoon. Neither of these inorganics was a Step 2 COPC in lagoon sediment. In addition, both copper and iron in sediment were comparable to or below background UTLs in incremental and discrete soil samples. Thus, neither chemical has a likely anthropogenic source in the ECA Lagoon. The marine ESV for iron in the final ERA protocol (50 µg/L) was from a secondary source (Buchman, 2008). Consulting the primary source cited in Buchman (2008), British Columbia Ambient Aquatic Life Guidelines, indicated that the current document (March 2008) concludes that there are insufficient data to develop a marine-based value for iron. The freshwater value for dissolved iron (350 µg/L) from this reference is higher than the maximum detected concentration in the lagoon (252 µg/L). Based upon this evaluation, no COCs were identified in lagoon surface water.

In sediment, manganese and selenium were identified as Step 3A COPCs in the ECA Lagoon based upon detected concentrations exceeding ESVs. In addition, two metals (beryllium and thallium), plus hexavalent chromium, were identified as Step 3A COPCs because they were detected but an ESV was not available. Total chromium concentrations were well below sediment ESVs, suggesting that hexavalent chromium would not be elevated either. Additionally, as discussed in Section 4.2.1, hexavalent chromium detected in site soil is likely naturally occurring. Beryllium, manganese, and thallium concentrations in sediment were below background UTLs in incremental and/or discrete soil samples. Further, the concentrations of all three of these inorganics were below the concentrations in soil samples from the lagoon fringe. Thus, their presence in the lagoon is likely attributable to background.

As noted in Section 4.2.1 and 4.2.2, selenium is likely naturally occurring at the site. In addition to not being a common component of munitions, the selenium concentrations observed in the ECA lagoon sediment (approximately 1 mg/kg to 3 mg/kg) are comparable to the concentration range observed in UXO 1 surface soil (less than 1 mg/kg to about 3 mg/kg).

Based upon the above evaluation, no COCs were identified in lagoon sediment.

For selenium, MATC-based HQs were as high as 6.60 (velvet free-tailed bat; **Table L-37**) and the LOAEL-based HQ was as high as 5.13. However, as discussed above, selenium in lagoon sediments is not likely elevated above background levels. Further, the sediment-invertebrate BAF used in the food web model was based upon mollusks (due to the lack of data for other taxa), which are not prey items for the spotted sandpiper, cave swallow, or velvet free-tailed bat. CDWR (2006) reports a regression equation for selenium uptake from sediment to the tissues of aquatic insects (corixids) from a hypersaline water body in California (salinity of about 45 ppt, within the range observed in the ECA Lagoon; **Table L-1**). This equation is for an aquatic invertebrate species more likely to be consumed by the sandpiper and more representative of consumption by the two aerial insectivorous receptors. The equation is as follows:

$$\text{Insect Se Concentration (mg/kg dw)} = 10^{(0.239+(0.359*\log(\text{Se Sediment Concentration, mg/kg})))}$$

Using this equation and the mean sediment concentration of selenium (1.79 mg/kg) yields an insect tissue concentration of 2.137 mg/kg dry weight. Entering this calculated tissue concentration into the food web model (for mean exposures) would result in MATC-based HQs below one for all receptors except the velvet free-tailed bat (HQ of 1.42), whose LOAEL-based HQ also exceeded one by a small amount (HQ of 1.10). However, as discussed in Section 1.2.3.4 and Section 1.6, there is a high degree of uncertainty regarding the estimation of bioaccumulated chemicals in aerial insects that are consumed by insectivorous bats (free-tailed bat) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates and are thus likely to overestimate tissue concentrations. In addition, NIWQP (1998) reports (based upon a review of 27 studies) a preliminary toxic threshold for selenium of 2.5 mg/kg in sediment (population-based EC_{10} for fish and birds in freshwater systems); the EC_{100} for such effects was estimated to be about 4.0 mg/kg. This threshold (2.5 mg/kg) is similar to the maximum observed selenium concentration in ECA Lagoon sediments (2.7 mg/kg) and above both the 95% UCL (2.08 mg/kg) and mean (1.79 mg/kg) sediment concentrations in the lagoon. For these reasons, selenium is not considered a COC for aquatic food web exposures at the site.

8.5 ERA Summary and Conclusions

In summary, no COCs were identified for surface soil, surface water, or sediment exposures at UXO 1. Similarly, no COCs were identified for food web exposures. Thus, risks to ecological receptors are acceptable at UXO 1 and no further evaluation or remediation is warranted with respect to ecological receptors.

SECTION 9

Summary, Conclusions, and Recommendations

Historical activities at the LIA had the potential to release MEC and other munitions-related material at UXO 1 which, in turn, had the potential to release chemical contaminants to environmental media from historical detonations and from the deterioration of MEC and related munitions debris. Therefore, the objectives of this RI were to:

- Sufficiently characterize the nature and extent of MEC and other munitions-related material
- Assess the explosive safety risk associated with the site (based on the post-interim removal action site conditions and current and future land use)
- Sufficiently characterize the nature and extent of potential contamination within soil, surface water, and sediment, with special emphasis on areas with the highest potential for contamination

Assess the potential risks posed by potential contamination to human health and the environment.

9.1 Summary of Remedial Investigation Activities

The RI is intended to support the consideration of risk-based cleanup decisions and the development and evaluation of interim, if applicable, and long-term solutions to address site related impacts. The UXO 1 RI was implemented through two separate, but related investigations – one focusing on MEC and one focusing on chemical contaminants in the various environmental media primarily associated with historical munitions-related activities.

- The nature and extent of MEC and other munitions-related material were characterized as part of two interim removal actions: a TCRA from January through December 2008 to characterize and remove munitions from the ground surface throughout UXO 1, and a NTCRA from April 2010 through February 2011 to characterize and remove sources of subsurface geophysical anomalies along roads and beaches within UXO 1. Results from these removal actions, including air- and ground-based surveys (magnetometer and LiDAR), not only characterized the nature and extent of MEC and other munitions-related material, but also provided sufficient information to assess the explosive safety hazard associated with the site and to select the most appropriate locations for sampling as part of the environmental media characterization.
- The environmental characterization component of the RI was conducted from January to February 2011 using, in part, the nature and extent of MEC and other munitions-related material to assess the nature and extent of potential contamination and associated environmental and human health risks.

9.1.1 MEC Investigation

- Removed vegetation to provide access for the MEC characterization and removal
- Conducted surface removal of MEC and other munitions-related material across the site
- Performed a geophysical survey over roads and beaches (plus 25-foot buffer zones on each side of the roads) to identify the locations of subsurface metallic items that may have been indicative of MEC; removed MEC and associated munitions-related material identified in the subsurface along the roads and associated buffers (to a depth of 2 feet below ground surface [bgs]) and sandy beaches (to a depth of 4 feet bgs)
- Utilized the information gathered during the surface and subsurface characterization and removal activities to characterize the nature and extent of MEC present at UXO 1 and assess potential explosive safety risks

9.1.2 Environmental Investigation

- Development of a conceptual model for the origin of and release mechanisms of contamination to environmental media from historical activities occurring adjacent to UXO 1.
- Collection of surface and subsurface soil, sediment, and surface water samples from five unique decision units (Beach, Lowland, Upland, Lagoon, and Lagoon Fringe to provide sufficient information for assessing nature and extent of contamination and potential risks.
- Performance of quantitative human health and ecological risk assessments using the environmental media data.

9.2 Findings

9.2.1 Physical Characteristics

- The topography of UXO 1 is relatively flat with a few high relief areas to the west and along the cliffs. The ground elevation at the site ranges between 0 and approximately 20 meters (0 to about 60 ft) amsl.
- A 9-acre unnamed lagoon partially surrounded by a narrow fringe of mangroves is present in the northwestern portion of UXO 1 (denoted as the ECA Lagoon in this RI Report). The lagoon is not tidally influenced and the temporal presence of surface water is believed to be wholly or mostly the result of precipitation. During dry periods, the lagoon has been observed to dewater, with salts appearing on the lagoon flat. The lagoon has been isolated from the adjacent Bahia Playa Blanca by a stretch of forested upland since 1937, based on historic aerial photographs.
- The geology of UXO 1 is characterized as limestone and dolomite primarily exposed at the ground surface, and beach sand at Bahia Playa Blanca beach. The upland areas generally contain bedrock exposed at the surface, loose stones, and very shallow soil between exposed bedrock. Within the lowland areas, beach sands intermixed with limestone are encountered at the surface. Sediment within the lagoon is primarily silt and clay with limited organic matter.
- UXO 1 is located over 6 miles from the eastern boundary of the Esperanza aquifer. Groundwater within UXO 1 primarily occurs within the limestone and dolomite bedrock; however, groundwater was encountered within unconsolidated sand at a depth of 1 ft below ground surface adjacent to the lagoon. The groundwater table is likely encountered near sea level and tidally influenced. Groundwater discharge is to the ocean and is not believed to perennially discharge to the lagoon since the lagoon is periodically dry. Groundwater seeps were not observed along the cliff faces. The general groundwater geochemistry is likely brackish to saline and hard.

9.2.2 Nature and Extent of Contamination

MEC

- Because UXO 1 was not designated as a target area for ATG bombing and naval gunfire, the MEC and other munitions-related material densities identified were much lower than the adjacent UXO sites that make up the beaches, roads, and interior of the former LIA (UXOs 2, 3, and 4, respectively). Most of the MEC and other munitions-related material were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA.
- A total of 1,308 MEC were removed from the ground surface at UXO 1. Although the density of material varied throughout UXO 1, the overall density averaged 10 surface MEC per acre. The estimated density of MEC removed from the western portion of UXO 1, near the boundary with the former LIA, was 16 surface MEC per acre, and the estimated density for the eastern portion of the site was 4.5 surface MEC per acre.
- In addition to the MEC, 784 MD and 10,487 RRD were removed from the ground surface during the TCRA. The density and distribution of the MD and RRD were similar to those of the MEC removed from the site.
- The general density and distribution of subsurface MEC identified during the subsurface NTCRA were consistent with those observed during the surface TCRA; the density of anomalies was highest in the vicinity of the former LIA and decreased eastward. A total of 1,177 discrete anomalies and 6 anomaly polygons were investigated during the NTCRA and a total of 3,539 metallic items were found within those anomalies. Intrusive sampling of the anomalies and polygons revealed MEC, MD, and RRD. A total of 97 MEC were found from 91 of the anomalies (discrete and polygon) identified by digital geophysical mapping (DGM).
- A total of 156 anomalies identified in the NTCRA area were considered “no finds.” These “no finds” consisted of 23 anomaly locations hole was dug to depth and the source of the anomaly was not identified, 30 anomaly locations where water was encountered before reaching the source of the anomaly or the maximum clearance depth, and 103 were locations where anomalies were identified through the initial DGM survey but no materials were recovered from the location (65 of which were below the investigation threshold during the reacquisition process). As such, the source of the anomalies where the maximum depth was reached or water was encountered before finding the item(s) may potentially be MEC. The items where water was encountered did not

demonstrate any particular pattern other than being located on the beaches. The items where the maximum depth was reached appear to be clustered in low/depositional areas at the site.

Environmental Media

Analytical data collected during the UXO 1 RI sampling provide the basis for the evaluation of the nature and extent of contamination in soil, surface water, and sediment. A total of 27 incremental surface soil, 9 discrete surface soil, 15 discrete subsurface soil, 15 discrete sediment, and 5 discrete surface water samples were used to characterize site conditions. The sample locations were selected to conservatively represent the site in terms of exposure areas and media; distribution, density, and type of contaminants sources; and key migration pathways. They were also selected to provide sufficient spatial coverage across the site. In addition, 10 shallow soil background incremental samples were collected from lithologic areas similar to UXO 1, but within areas not potentially impacted by activities associated with UXO 1. Key findings were:

- Nitrobenzene was the only explosive detected in surface soil at UXO 1 above a screening criterion; it was detected in one sample (98 NJ μg/kg) above the soil screening level (SSL) of 6.8 μg/kg. However, the detected concentration is between about two and three orders of magnitude below risk-based screening criteria. This sample (4DU03) was collected along the boundary with the LIA. Other detected explosives, but at concentrations below screening criteria within surface soil, include 1,3,5-trinitrobenzene (one detection), 2,4,6-trinitrotoluene (one detection), 3,5-dinitroanaline (one detection), octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (one detection), tetryl (one detection), and perchlorate (twelve detections). In all cases, the detected concentrations of the explosives are between about an order of magnitude and more than five orders of magnitude below all screening criteria.
- No explosives were detected in subsurface soil.
- No explosives were detected in surface water or sediment of the UXO 1 lagoon.
- Inorganic constituents detected above background concentrations (if available) and screening criteria in environmental media comprise:
  - **Soil** –arsenic, cobalt, chromium (hexavalent), iron, and selenium. However, because of their relatively low magnitude of background exceedances, relatively uniform distribution across the site, relatively minor contribution in munitions, and/or likely association with lithology present at UXO 1, the concentrations of all at UXO 1 are likely to be wholly or primarily attributable to background.
  - **Surface Water and/or Sediment** – aluminum, arsenic, barium, chromium, cobalt, copper, iron, manganese, selenium, thallium, and vanadium. Like the inorganics present in soil, multiple lines of evidence suggest the concentrations of these inorganics in surface water and/or sediment of the lagoon are likely to be wholly or primarily attributable to background.

9.2.3 Contaminant Migration

- The potential sources of contamination at UXO 1 are munitions and munitions-related material, most likely from munitions directed toward the LIA that missed their intended target during naval gunfire and air-to-ground training activities. MEC at UXO 1 had the potential to release chemical contaminants to environmental media, from historical detonations and from the deterioration of MEC and related munitions scrap.
- The low concentrations of explosives in surface soil, the absence of explosives in subsurface soil and the lagoon surface water and sediment, and the presence of inorganics that are wholly or primarily attributable to background suggest the potential for contaminant migration from wind erosion, surface runoff, and leaching to and migration with groundwater is insignificant.

9.2.4 Land Use

- UXO 1 is part of the National Wildlife Refuge for which no public access or groundwater use is intended; however, limited work by USFWS (refuge management) and the U.S. Coast Guard (beacon maintenance) may be conducted. Due to the presence of high cliffs and shallow coral reefs surrounding the ECA and the presence of the LIA to the west, the potential for trespassing at UXO 1 is low.

9.2.5 Human Health Risk Assessment

- Potential current/future receptors evaluated in the HHRA consisted of USFWS workers engaged in a variety of refuge management and law enforcement activities, trespassers, and Coast Guard workers. Conservative exposure pathways included (variously based on the receptor) ingestion, dermal contact, and inhalation of COPCs in soil; ingestion and dermal contact of COPCs in sediment; and dermal contact of COPCs in surface water.
- No COCs were identified based on human exposure to COPCs in site soil, sediment or surface water at UXO 1. Therefore, no unacceptable human health risks are present at UXO 1.

9.2.6 Ecological Risk Assessment

- The ERA evaluated both terrestrial and aquatic habitats. In summary, no COCs were identified for individual plant and animal receptor exposure to surface soil, surface water, or sediment exposures at UXO 1. Similarly, no COCs were identified for food web exposures. Thus, no unacceptable risks to ecological receptors are present at UXO 1.

9.3 Conclusions and Recommendations

A TCRA was completed across UXO 1 during which surface MEC and other munitions-related items were characterized and removed. Additionally, ground- (magnetometer) and aerial-based (LiDAR and aerial magnetometer) surveys were conducted to determine the presence and estimate the quantity of munitions-related material in the subsurface across UXO 1. Subsurface MEC and other munitions-related material were removed along roads and beaches of UXO 1. As a result of these activities, the nature and extent of MEC and associated munitions-related material were sufficiently characterized in order to conduct explosive risk evaluations. These evaluations indicate the explosive safety risk along the beaches is low and within the remaining terrestrial areas is moderate.

Based on the CSM for the site and historical information, including the information gathered during the MEC characterization and removal activities, sampling was performed across UXO 1 to characterize the nature and extent of contamination in environmental media. The sample locations were selected to conservatively represent the site in terms of exposure areas and media; distribution, density, and type of contaminants sources; key migration pathways; and sufficient spatial distribution. Analytical data for the environmental media samples suggest explosives and inorganics contamination in soil at the ECA is negligible. This is further emphasized by the fact that the incremental and discrete soil samples represented approximately 900 analyses, in which there were only 16 explosive detections, all but one of which are orders of magnitude below screening criteria. Quantitative human health and ecological risk assessments performed using the environmental media samples collected at the site indicate there is no unacceptable risks to potential human or ecological receptors at the site.

Based on the above information, the following path forward is recommended for UXO 1:

- No further investigation is warranted; the nature and extent of MEC, other munitions-related material, and associated contamination have been sufficiently delineated to make remedial action determinations
- No action is warranted to address potential human and ecological receptor exposure to chemical concentrations in environmental media based on the current and future proposed land use. Because the site is designated as part of the Vieques National Wildlife Refuge, a potential future residential land use scenario is precluded. However, a feasibility study is warranted to address potential explosive safety risk associated with the potential presence of MEC. Alternatives evaluated in the FS will include land use controls that preclude the site from a future unrestricted land use, account for the potential presence of MEC, and are consistent with its designation as a National Wildlife Refuge. A feasibility study is warranted to evaluate remedial alternatives to address the explosive safety risk associated with the ongoing potential presence of MEC at the site.

SECTION 10

References

Bauer, L.J. and M.S. Kendall (eds). 2010. *An Ecological Characterization of the Marine Resources of Vieques, Puerto Rico. Part II: Field Studies of Habitats, Nutrients, Contaminants, Fish, and Benthic Communities*. NOAA Technical Memorandum NOS NCCOS 110. Silver Spring, MD. 174 pp.

Bonnin, et al. 2006. *NOAA Atlas 14, Precipitation-Frequency Atlas of the United* States, Vol. 3, Ver. 4.0: Puerto Rico and the U.S. Virgin Islands.

Buchman, M.F. 2008. *NOAA screening quick reference tables.* NOAA OR&R Report 08-1, Seattle, WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration. 34 pp.

California Department of Water Resources (CDWR). 2006. *Salton Sea Ecosystem Restoration Program. Draft Programmatic Environmental Impact Report.* Prepared by Department of Water Resources and Department of Fish and Game, with assistance from CH2M HILL. State Clearinghouse #2004021120. October.

CH2M HILL. 2000. *Site-Specific Work Plan for the U.S. Naval Ammunition Support Detachment, Vieques, Puerto Rico.* April.

CH2M HILL. 2001. *Master Work Plan for the Former U.S. Naval Ammunition Support Detachment, Vieques, Puerto Rico*. January.

CH2M HILL. 2002. *Soil, Surface Water, and Sediment Background Investigation Report, U.S. Naval Ammunition Support Detachment, Vieques Island, Puerto Rico.* October 16.

CH2M HILL. 2003. *Final Draft Preliminary Range Assessment Report, Vieques Naval Training Range, Vieques Island, Puerto Rico*. April.

CH2M HILL. 2005. *Final Time Critical Removal Action/Interim Measures Work Plan, Surface Munitions of Explosives Concern at Munitions Response Area-Live Impact Area, Munitions Response Sites 1 through 8, 13, 15 through 20, and 29 through 31, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico.* March.

CH2M HILL. 2006. *Final Time Critical Removal Action/Interim Measures Work Plan Amendment, Surface Munitions and Explosives of Concern at Munitions Response Area-Eastern Conservation Area and Munitions Response Area-Live Impact Area: Munitions Response Sites 9 through 12, 14, and 21 through 28, Former Vieques Naval Training Range (VNTR) Vieques, PR.* July.

CH2M HILL. 2007a. *Final East Vieques Background Soil Inorganics Investigation Report, For* Master Quality Assurance Project Plan, Environmental Restoration Program, Vieques, Puerto Rico. May.

CH2M HILL. 2007b. *Master Quality Assurance Project Plan, Environmental Restoration Program, Vieques, Puerto Rico.* May.

CH2M HILL. 2008. *Final Work Plan for Munitions and Explosives of Concern Subsurface Removal Action, Beaches and Select Roadways, Former Vieques Naval Training Range and Former NASD Solid Waste Management Unit 4, Vieques, Puerto Rico.* October.

CH2M HILL. 2009. *Final Non-Time Critical Removal Action Work Plan, Surface Munitions and Explosives of Concern at Munitions Response Area-Surface Impact Area, Munitions Response Sites 1 through 7, Former VNTR, Vieques, Puerto Rico*. January.

CH2M HILL. 2010a. *Final Master Standard Operating Procedures, Protocols, and Plans for the Environmental Restoration Program, Vieques, Puerto Rico*. April.

CH2M HILL. 2010b. *Final Expanded Range Assessment/Site Inspection Report, Vieques Naval Training Range, Vieques, Puerto Rico*. September.

CH2M HILL. 2010c. *Time-Critical Removal Action, Interim Action for the Removal of Surface Munitions and Explosives of Concern at Munitions Response Areas – Live Impact Area, and Eastern Conservation Area*. October.

CH2M HILL. 2010d. *Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration Program – Update 1 (Addendum)*. Draft. August.

CH2M HILL. 2010e. *Final Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico.* August.

CH2M HILL. 2011a. *Final Remedial Investigation Sampling and Analysis Plan Eastern Conservation Area*. January.

CH2M HILL. 2011b. Human Health Risk Assessment Pre-Interim Deliverable for UXO 1 (RAGS Part D Tables 1 through 3). June.

CH2M HILL. 2011c. Interim Deliverable for the Human Health Risk Assessment – RAGS Part D Tables – Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico. September.

CH2M HILL. 2011d. Draft Interim Deliverable for the Ecological Risk Assessment – Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico. June.

Chief of Naval Operations (CNO). 1999. *Navy policy for conducting ecological risk assessments.* Memorandum from Chief of Naval Operations to Commander, Naval Facilities Engineering Command. Ser N453E/9U595355.

ERG. 2003. *Draft Issue Paper on the Environmental Chemistry of Metals.* Prepared for the U.S. EPA. August.

Geo-Marine, Inc. 2002. *Mangrove Forest Health Status Vieques Island, Naval Station Roosevelt Roads, Puerto Rico.* March. Draft.

Geo-Marine, Inc. 2007. *Biological Assessment of the Former Live Impact Area within the Former Vieques Naval Training Range, Vieques Puerto Rico, Amendment I: Eastern Conservation Area*. December.

Greenleaf/Telesca Planners, Engineers, Architects Inc and Ecology & Environmental Inc. 1984. *Initial assessment study,* Naval Station Roosevelt Roads, Puerto Rico. September.

Lindsay, Willard L., 1979. *Chemical Equilibria in Soils*.

National Irrigation Water Quality Program (NIWQP). 1998. *Guidelines for interpretation of the biological effects of selected constituents in biota, water, and sediment.* National Irrigation Water Quality Program Information Report No. 3. U.S. Department of the Interior, Denver, CO. November.

Naval Facilities Engineering Command (NAVFAC). 2003. *Navy guidance for conducting ecological risk assessments*. (http://web.ead.anl.gov/ecorisk/). February.

Pilcher, T., et al., Determination of arsenic concentration and distribution in the Floridian Aquifer System. J. Geochem. Explor. 2011, doi:10.1016/j.gexplo.2011.02.004.

Program Management Company. 2000. *Final Environmental Baseline Survey, Naval Ammunition Support Detachment, Vieques Island, Puerto Rico*. October 17.

Southeastern Archaeological Research, Inc. 2007. *End-of-Fieldwork Executive Summary, MRP Program Archaeological Survey of Eastern Conservation Area, Vieques National Wildlife Refuge/Former Vieques Naval Training Range*. September.

US Army Corps of Engineers (USACE). 2009. *Interim Guidance 09-02, Implementation of Incremental Sampling (IS) of Soil for the Military Munitions Response Program*. July.

United States Environmental Protection Agency (USEPA). 1979. *Water-related Environmental Fate of 129 Priority Pollutants*. Vol 1: Introduction and Technical Background, Metals, Inorganics, Pesticides, and PCBs. Office of Water and Waste Management, Washington, D.C. December.

USEPA. 1989. *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A)*. EPA/540/1-89/002.

USEPA. 1991. *Human Health Evaluation manual – Supplemental Guidance, Standard Default Exposure Factors*. Interim Final. WSWER Directive 9285.6-03.

USEPA. 2001. *RAGS Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim EPA/540/R/99/005*. September.

USEPA. 2002a. *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*. September.

USEPA. 2002b. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*.

USEPA. 2004. *Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim EPA/540/R/99/005.* September.

USEPA. 2008. *Munitions and Explosives of Concern Hazard Assessment Methodology EPA/505/B/08/001*. October.

USEPA. 2009a. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters* . Office of Solid Waste and Emergency Response. June.

USEPA. 2009b. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment).* EPA-540-R-070-002. OSWER 9285.7.82. January.

United States Geological Survey (USGS). 1989. *Water Resources Investigation, Reconnaissance of the Groundwater Resources of Vieques Island, Puerto Rico*. Report 86-4100 (by Sigfredo Torres-Gonzalez).

USGS. 1995. *Water Wells on Isla De Vieques, Puerto Rico*. Report 95-368, 34p. (by Cherry, G.S., and Ramos, Juan).

Welch, A.H., M. Lico, and J. Hughes. 1988. *Arsenic in Ground Water of the Western United States*. Groundwater. 26(3): 333-347.

Appendices

Appendix A
Surface Water and Sediment Sampling Data Sheets

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD01 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER SUNNY, WINDY FROM EAST SAMPLER : D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN CORE TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 0930 END : LOGGER : J. MARTIN

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
				DARK BLACK SAND INCLUSIONS	
				STRONG REDUCING ODOR	
6"				LOW PLASTICITY	
				SOFT SANDY CLAY	
				SOME COARSE SAND	
				WATER DEPTH	COORD
				= 1.2 FT	20 0 0258865
					2006820
				SAMPLE	
				VEECA - 5SD01 - 000H - 0211	
				0930 2/10/11	
			*	EPA - COLLECTED NATIVE, MS, MSD	
				SPLIT 0930 2/10/11	

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD01	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA | LOCATION : Lagoon Decision Area 5 | DATE:

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEDIMENT WAS SAMPLED BY PUSHING A LEXAN CORE TUBE (1-INCH DIAMETER, 2-FEET LONG) INTO THE SEDIMENT TO A MAXIMUM DEPTH OF 6-INCHES. BY PLACING ONE HAND OVER THE TOP OF THE TUB TO MAINTAIN A VACCUUM, THE LEXAN TUBE WAS PULLED OUT OF THE SEDIMENT CONTAINING A PLUG OF SEDIMENT. THE SEDIMENT WAS EXTRACTED BY ~~EITHER~~ "IN" SQUEZING THE SIDES OF THE TUBE, FOLLOWED BY SHAKING UNTIL THE SEDIMENT PLUG WAS DISLOGED. ADDITIONALLY, FOR DIFFICULT SAMPLE CORES, A SECOND LEXAN TUBE WAS SPLIT DOWN THE SIDE WITH SCISSORS, ROLLED TO A SMALLER DIAMETER, THEN INSERTED AS A PUSHING TOOL INTO THE SAMPLE TUBE TO HELP FORCE THE SAMPLE OUT AND INTO THE STAINLESS STEEL BOWL.

SOP G-2 DOES NOT INCLUDE THE USE OF LEXAN TUBES AS A SOLE CORING DEVICE, THOUGH THEY ARE NORMALLY A COMPLEMENT OF STANDARD CORING DEVICES DESCRIBED IN SOP G-2. SCOOPS, CORERS, AND DREDGES ARE DESCRIBED IN SOP G-2, HOWEVER IT WAS FOUND IN THE FIELD THAT NONE OF THESE DEVICES WOULD EFFECTIVELY COLLECT SEDIMENT IN THE ECA LAGOON DUE TO VERY TIGHT, STICKY, SOLID SEDIMENT. THE OPTION OF USING A LEXAN TUBE (AS WELL AS SPIK ALGER) WAS DISCUSSED WITH ~~TWO~~ THREE "IN" EPA REPRESENTATIVES (2/9 AND 2/10/11) (MICHAEL MERCADO, SERGIO LOPEZ, DANNY RODRIGUEZ), AND THEY AGREED THAT EITHER METHOD COULD BE USED. IT WAS DECIDED TO USE LEXAN TUBES FOR SAMPLING ALL ECA LAGOON SAMPLES.

Sampler Signature: [signature] Date: 2/10/11

1111

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD02 SHEET 1 OF 2
	SEDIMENT SAMPLE LOG	

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAN

SAMPLING METHOD AND EQUIPMENT USED LEXAN CORE TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 0900 END : LOGGER : J. MARTIN

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				SILTY CLAY, FAIRLY STIFF GREENISH GRAY COLOR NO ODOR TRACES OF DARK ORGANIC	
				WATER DEPTH = 0.95 FT	COORD 20 Q 0258897 2006818
				COLLECTED VEECA - SSD02 - 000H - 0211 0900 2/10/11 VEECA - SSD02P - 000H - 0211 (DUP) * EPA SPLIT - 1-8oz, 1-4oz > AMBER 0900 2/10/11	
				~~COORDINATE~~ JM ~~20Q 0258895~~ ~~2006818~~	

Sampler Signature: John M Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD02	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

- see p 2 of 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD03 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, P. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN CORE TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1105 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				CLAY, SOME FINE STAIN SAND GRAY / DARK GRAY BLACK STAINGERS NO ODOR	
					COORD
				WATER DEPTH = 1.0 FT	20 Q 0258910 2006765
				SAMPLE VEECA - BSD03 - 0004 - 0211 1105 2/10/11	
			*	NO CPA SPLIT	

Sampler Signature: John H Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD03	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA | LOCATION : Lagoon Decision Area 5 | DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 of 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD04 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN CORE TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1255 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				SANDY CLAY ~~FINAN~~ GETS FINER WITH DEPTH. ANGULAR MEDIUM DEFINED BLACK SAND NEAR SURFACE BROWNISH GRAY/BROWN CLAY - SOFT	
				DEPTH = 1.0 FT	COORD 20Q 0258951 2006706
				SAMPLE VEECA - 5SD004 - 000H - 0211	
				* NO EPA SPLIT SAMPLE	

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD04	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD05	SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN CORE TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: See Below START : 1320 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				MOSTLY CLAY WITH FINE SAND STIFF GREENISH GRAY	
				NO ODOR	
					COORD
				SAMPLE	20 Q 0258985
				1320 2/10/11	2006642
				VEECA - 5SD005 - 000H - 00N	
				+ MS/MSD	
			X	EPA SPLIT COLLECTED	
				1320 2/10/11 NATIVE	

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD05	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 42

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD06 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER Windy, Sunny SAMPLER : J. Marta, P. Balaam

SAMPLING METHOD AND EQUIPMENT USED Lexan Tube, Stainless Bowl and Spoon

UTM LOCATION: See Below START : 1405 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				SANDY CLAY STIFF GREENISH GRAY NO ODOR	
				DEPTH = 1.0 FT SAMPLE VEECA - 5SD06 - 0001 - 0211 1405 * NO EPA SPLIT	COORD 20 Q 0259015 2006625

Sampler Signature: John N Marta Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD06	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 4/4

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD07 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1425 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				STIFF CLAY FINE SAND DARK GREENISH GRAY NO ODOR	
				DEPTH = 0.95 FT	COORD 20 Q 0259042 2006592
				SAMPLE: 1425 2/10/11 VEECA - SSD07 - 000H - 0211	
			X	EPA SPLIT 1425 2/10/11	

Sampler Signature: John H Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD07	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD08 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1500 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT.	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				SANDY CLAY STIFF LIGHT BROWN NO ODOR	
				WATER DEPTH = 1.1 FT	COORD 20 Q 0258957 2006639
				SAMPLE 1500 2/10/11 VEECA-SSD08-0001-0211	
				* EPA SPLIT 1500 NATIVE + DUPLICATE	

Sampler Signature: John T. Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD08	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: John M Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD09 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, FROM E, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED

UTM LOCATION: SEE BELOW START : 1220 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				CLAY, FAT SOME FINE SAND STIFF 4-6" SOFT 0-4"	
				NO ODOR GREENISH GRAY	COORD 20 Q 0258900 2006711
				SAMPLE 1220 VEECA-5SD009-000H-0211 2/10/11	
			*	EPA SAMPLE 1220 2/10/11	

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD09	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 4

Sampler Signature: John H Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD10 ✓ SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER Windy, Sunny SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: See Below START : 1025 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				CLAY WITH SOME FINE SAND GRAY STIFF NO ODOR	
					COORD 20 Q 0258863 2006764
				WATER DEPTH 1.0 F	
				SAMPLE 1025 2/10/11 VEECA-SSD010-000H-Q211	
			*	EPA SPLIT 1025 2/10/11	

Sampler Signature: John N Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD10	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA | LOCATION : Lagoon Decision Area 5 | DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD11 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAR

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 0955 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
				SAND AND CLAY	
				UPPER 2 INCHES BROWN, ORGANIC LAYER	
6"				STIFF	
				SAND MEDIUM TO FINE	
				GRAYISH BROWN	
				NO ODOR	
				WATER DEPTH = 0.5 FT	
					COORD
					20 @ 0258839 2006795
				SAMPLE	
				VEECA - SSD011 - 000H - 0211	
				VEECA - SSD011 P. 000H - 0211	
				0955	
			*	NO EPA SPLIT	

Sampler Signature: John R Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD11	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD12 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER Sunny, Windy (From E) SAMPLER : J. Martin, D. Ballam

SAMPLING METHOD AND EQUIPMENT USED Coran Tube, Stainless bowl and spoon

UTM LOCATION: See Below START : 1200 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES, ISSUES, LOCATION COMMENTS
3"				REFUSAL AT 3" - FRAGIPAN DARK GRAY	DENSE SUBMERGED AQUATIC VEGETATION.
6"	X	X	X	MOSTLY CLAYEY SAND SOME GRAVEL WEATHERED LIMESTONE	ABOUT 30' FROM SHORE
				WATER DEPTH = 0.7 FT	COORD 20 Q 0258843 2006740
				SAMPLE VEECA-5SD012-000H-0211 1200	
			*	NO EPA SPLIT SAMPLE	
				ACTUAL DEPTH = 3 INCHES	

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD12	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD13 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION** : Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1600 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
3"				REFUSAL AT 3 INCHES	
6"				GRAVEL ON SURFACE CLAYEY SAND HARD DARK GRAY/BLACK 0-1.5" 1.5 TO 3" STIFF CLAY AND SAND BROWN	COORD RO @ 0258862 2006683
				SAMPLE 1600 2/10/11 VEECA-5SD13-000H-0211 - ACTUAL DEPTH = 3 INCHES	
			*	EPA COLLECTED ONE NATIVE SAMPLE 1600 2/10/11	

Sampler Signature: John M Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD13	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 8/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 8 OF 46

Sampler Signature: [signature] Date: 8/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD14 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER Windy, Sunny SAMPLER : J. Martin, P. Ballam

SAMPLING METHOD AND EQUIPMENT USED Lexan Tube, Stainless Bowl and Spoon

UTM LOCATION: See Below START : 1525 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				TAN SANDY CLAY STIFF NO ODOR	
					COORD 20Q 0258906 2006648
				WATER DEPTH = 0.92 FT	
				SAMPLE 2/10/11 1525 VEECA-SSD014-000H-0211	
			*	NO EPA SPLIT	

Sampler Signature: John H Martin Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD14	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Decision Area 5 DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

SEE PAGE 2 OF 4C

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD15 SHEET 1 OF 2

SEDIMENT SAMPLE LOG

PROJECT NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **LOCATION :** Lagoon Decision Area 5 **DATE:** 2/10/11

WEATHER WINDY, SUNNY SAMPLER : J. MARTIN, D. BALLAM

SAMPLING METHOD AND EQUIPMENT USED LEXAN TUBE, STAINLESS BOWL AND SPOON

UTM LOCATION: SEE BELOW START : 1535 END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	SEDIMENT DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES, ISSUES, LOCATION COMMENTS
6"				ABUNDANT LARGE GRAVEL NEARBY 20 FT FROM SHORE SAND AND CLAY SOME ANGULAR GRAVEL TAN NO ODOR DEPTH = 0.7 FT SAMPLE 1535 2/10/11 VEECA-5SD15-000H-0211 *NO EPA SPLIT	ON SHORE COORD 20 Q 0258953 2006619

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SD15	SHEET 2 OF 2

SEDIMENT SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA | LOCATION : Lagoon Decision Area 5 | DATE: 2/10/11

NOTES

SOP(s) used (refer to SOP Log)? G-2

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

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

See PAGE 2 OF 46

Sampler Signature: [signature] Date: 2/10/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW01	SHEET 1 OF 2

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

Project: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **Location:** VEECA-5SW01

FIELD CREW: J. MARTIN, D. BALLAM **SAMPLE ID(s):** VEECA-5SW01-0211

DATE/TIME: 2/9/11 0925 **MS/MSD:** YES / (NO) **Field Dup:** YES/(NO)

DEPTH OF WATER (FT): 1.0 FT **CLOUD COVER:** 90% WINDY

FLOW VELOCITY AND DIRECTION: **LAST RAIN EVENT:**

AMBIENT TEMPERATURE: ~ 75°F

FIELD PARAMETERS

Time	Conductivity (µmhos)	DO (mg/L)	Salinity (ppt)	Temperature (°C)	pH (su)	ORP	Turbidity (NTU)	Comments
0925	32,669	6.50	20.42					pH PROBE
							80.5	ACTING UP
								WILL FIX AND MEASURE LATER
2/11/11 0850	32 880	5.70	20.57	23.50	7.40	865.8	155	

SAMPLE PARAMETERS ((GRAB) OR COMPOSITE): EXPLO, METAL, GRAINSIZE

OBSERVATIONS

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY ~~WHITE~~ GREEN , OTHER:

ODOR: (NONE) , LOW , MEDIUM , HIGH , VERY STRONG , ~~H2S~~ , ~~FUEL LIKE~~ , CHEMICAL, UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , (HIGH) , VERY TURBID. HEAVY SILTS

NOTES

SOP(s) used (refer to SOP Log)? G-1, C-1

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

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

* COLLECTED SPLIT SAMPLE FOR EPA - 6 1-L AMBER , NATIVE
2 125 mL PLASTIC MS
MSD

OTHER: PLEASE USE BACK OF SHEET.FOR SKETCHING MAPS , **SEE BACK OF SHT** (Y) N.

Q.C. SAMPLE TYPE: EQUIPMENT BLANK, OTHER :

Sampler Signature: John R Martin **Date:** 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW01	SHEET 1 OF 2

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

PROJECT : LOCATION : VEECA-5SW01 DATE: 2/9/11

NOTES (CONTINUED)

N

(X) SW1 ~ 75' FROM SHORE

WATER MILKY GREEN, SHALLOW
STRONG WIND FROM SE; LIKELY STIRRING UP SOME SEDIMENT

2 - GREATER YELLOWLEGS
~40 WHITE CHEEK PINTAILS

Sampler Signature: John R Martin Date: ~~2/10/11~~ 2/9/11 JM 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW02	SHEET 1 OF 2

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

Project: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **Location:** VEECA-5SW02

FIELD CREW: J. MARTIN, D. BALLAM **SAMPLE ID(s):** VEECA- 05SW002 - 0211

DATE/TIME: 2/9/11 1010 **MS/MSD:** YES (NO) **Field Dup:** YES (NO) dm

DEPTH OF WATER (FT): 1.0 FT **CLOUD COVER:** 95% WINDY, FROM EAST

FLOW VELOCITY AND DIRECTION: **LAST RAIN EVENT:**

AMBIENT TEMPERATURE: ~ 75°F

FIELD PARAMETERS

Time	Conductivity (µmhos)	DO (mg/L)	Salinity (ppt)	Temperature (°C)	pH (su)	ORP	Turbidity (NTU)	Comments
1010	*						118	
	YSI METER HAD ACTING UP, WILL SAMPLE LATER							
2/11/11 0922	33122	6.02	20.73	23.84	7.48	890.9	155	

SAMPLE PARAMETERS (GRAB OR COMPOSITE): EXPLO, METAL, GRAINSIZE

OBSERVATIONS

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY ~~WHITE~~ GREEN , OTHER:

ODOR: (NONE) , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL, UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , (HIGH) , VERY TURBID. HEAVY SILTS WIND DRIVEN SUSPENSION

NOTES

SOP(s) used (refer to SOP Log)? G-1, C-1

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

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

COLLECTED EPA SPLIT SAMPLE

OTHER: PLEASE USE BACK OF SHEET.FOR SKETCHING MAPS , **SEE BACK OF SHT Y / (N.)**

Q.C. SAMPLE TYPE: EQUIPMENT BLANK, OTHER :

Sampler Signature: John M Martin **Date:** 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW02	SHEET 1 OF 2

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

PROJECT : LOCATION : VEECA-5SW02 DATE:

NOTES (CONTINUED)

Sampler Signature: _____ Date: _____

CH2MHILL

PROJECT NUMBER	STATION ID	SHEET 1 OF 2
392485.FI.FK	VEECA-5SW03	

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

Project: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA
Location: VEECA-5SW03
FIELD CREW: V. MARTIN, D. BALLAM
SAMPLE ID(s): VEECA-5SW003-0211

DATE/TIME: 2/9/11 1055
MS/MSD: YES / NO (NO circled) Field Dup: YES/NO (NO circled)
DEPTH OF WATER (FT): 1.05 FT
CLOUD COVER: 100%
FLOW VELOCITY AND DIRECTION: NONE
LAST RAIN EVENT:
AMBIENT TEMPERATURE:

FIELD PARAMETERS

Time	Conductivity (µmhos)	DO (mg/L)	Salinity (ppt)	Temperature (°C)	pH (su)	ORP	Turbidity (NTU)	Comments
1055							182	
2/11/11 0900	33029	6.12	20.67	23.51	7.54	876.4	197	

SAMPLE PARAMETERS (GRAB OR COMPOSITE): EXPLO, METAL, GRAINSIZE

OBSERVATIONS

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: GREEN

ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL, UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , HIGH , VERY TURBID. HEAVY SILTS

NOTES

SOP(s) used (refer to SOP Log)? G-1, C-1

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

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

COLLECTED EPA SPLIT SAMPLE, NATIVE AND DUPLICATE

OTHER: PLEASE USE BACK OF SHEET.FOR SKETCHING MAPS , SEE BACK OF SHT Y / N.

Q.C. SAMPLE TYPE: EQUIPMENT BLANK, OTHER :

Sampler Signature: Steven Martin Date: 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW03	SHEET 1 OF 2
	SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET		

PROJECT : LOCATION : VEECA-5SW03 DATE:

NOTES (CONTINUED)

Sampler Signature: _____ Date: _____

VEECA-5SW04 -0211-MS
VEECA-5SW04 - 0211-SD

CH2MHILL

PROJECT NUMBER	STATION ID	SHEET 1 OF 2
392485.FI.FK	VEECA-5SW04	

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

Project: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **Location:** VEECA-5SW04

FIELD CREW: J. MARTIN, D. BALLAM **SAMPLE ID(s):** VEECA-5SW004-0201

DATE/TIME: 2/9/11 1135 **MS/MSD:** YES / NO **Field Dup:** YES / NO

DEPTH OF WATER (FT): 1.1 FT **CLOUD COVER:** 50%

FLOW VELOCITY AND DIRECTION: NONE **LAST RAIN EVENT:**

AMBIENT TEMPERATURE: ~80°F

FIELD PARAMETERS

Time	Conductivity (µmhos)	DO (mg/L)	Salinity (ppt)	Temperature (°C)	pH (su)	ORP	Turbidity (NTU)	Comments
1135	*						117	
	YSI METER NOT FUNCTIONING CORRECTLY							
2/11/11 0912	33141	6.17	20.75	23.68	7.56	88.7	214	

SAMPLE PARAMETERS (GRAB OR COMPOSITE): EXPLO, METAL, GRAIN SIZE

OBSERVATIONS

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: GREEN µm

ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL, UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , HIGH , VERY TURBID. HEAVY SILTS

NOTES

SOP(s) used (refer to SOP Log)? G-1, C-1

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

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

*COLLECTED EPA SPLIT SAMPLE - NATIVE 2- 1L AMBER
1- 250mL PLASTIC

OTHER: PLEASE USE BACK OF SHEET.FOR SKETCHING MAPS , **SEE BACK OF SHT** Y / N

Q.C. SAMPLE TYPE: EQUIPMENT BLANK, OTHER :

Sampler Signature: John N Martin **Date:** 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW04	SHEET 1 OF 2

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

PROJECT : LOCATION : VEECA-5SW04 DATE:

NOTES (CONTINUED)

Sampler Signature: _____ Date: _____

CH2MHILL

PROJECT NUMBER	STATION ID	SHEET 1 OF 2
392485.FI.FK	VEECA-5SW05	

SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET

Project: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA **Location:** VEECA-5SW05

FIELD CREW: J. MARTIN, D. BALLAM **SAMPLE ID(s):** VEECA-~~SW~~ 5SW05 - 0211

DATE/TIME: 2/9/11 1230 **MS/MSD:** YES / NO **Field Dup:** YES/NO

DEPTH OF WATER (FT): 1.0 FT **CLOUD COVER:** 10% BREEZY

FLOW VELOCITY AND DIRECTION: NONE **LAST RAIN EVENT:**

AMBIENT TEMPERATURE: ~85° F

FIELD PARAMETERS

Time	Conductivity (µmhos)	DO (mg/L)	Salinity (ppt)	Temperature (°C)	pH (su)	ORP	Turbidity (NTU)	Comments
1230	*						170	
	YSI MALFUNCTIONING, WILL MEASURE LATER							
2/11/11 0907	33,056	5.08	20.69	23.64	7.35	877.2	~~214~~ 214 JM 2/9/11	

SAMPLE PARAMETERS (GRAB OR COMPOSITE): EXPLO, METALS, GRAINSIZE

OBSERVATIONS

COLOR: CLEAR , AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER: GREEN

ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG , H2S , FUEL LIKE , CHEMICAL, UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , HIGH , VERY TURBID. HEAVY SILTS WIND MIXING IN LAGOON

NOTES

SOP(s) used (refer to SOP Log)? G-1, C-1

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

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

* SPLIT SAMPLE WITH EPA - NATIVE SAMPLE

OTHER: PLEASE USE BACK OF SHEET.FOR SKETCHING MAPS , **SEE BACK OF SHT** Y (N)

Q.C. SAMPLE TYPE: EQUIPMENT BLANK, OTHER :

Sampler Signature: John R. Martin **Date:** 2/9/11

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-5SW05	SHEET 1 OF 2
	SURFACE WATER QUALITY SAMPLING FIELD DATA SHEET		

PROJECT : LOCATION : VEECA-5SW05 DATE:

NOTES (CONTINUED)

Sampler Signature: _____ Date: _____

Appendix B
Incremental Soil and Soil Boring Logs

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-1SB01	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Beach Decision Unit 2 DATE: 02/08/11

WEATHER: Clear, 82° F, 10-20 knots E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : shovel and spoons

WATER LEVELS Not encountered START : 0920 END : 0945 LOGGER : A. Luna

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
0.5	0 - 0.5	6	S-1		0.0 to 0.5' SAND (SW), pale yellow (5Y 8/2), dry, loose, fine to coarse grained sand, few organics	
1 1.5	0.5 - 1.5	12	S-2		0.5 to 1.5' SAND (SW), pale yellow (5Y 8/2), dry, loose, fine to coarse grained sand, heavy root concentration	
2	1.5 - 2	6	S-3		1.5 to 2.0' SAND (SW), pale yellow (5Y 8/2), dry, loose, fine to coarse grained sand, few organics	Collect sample VEECA-1SB01-1H02-0211 at 0945 for metals, explosives, and pH. Collect sample VEECA-1SB01-1H02-0211-MS at 0945 for metals and explosives. Collect sample VEECA-1SB01-1H02-0211-SD at 0945 for metals and explosives.
					Total Depth @ 2.0 ft bls	

Sampler Signature: **Antonio Luna** Date: **02/08/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-1SB01	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Beach Decision Unit 1 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/08/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-1SB02	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Beach Decision Unit 2 DATE: 02/08/11

WEATHER: Clear, 82° F, 10-20 knots E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Shovel and spoons

WATER LEVELS Not encountered START : 0950 END : 0955 LOGGER : A. Luna

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 - 0.5	6	S-1		0.0 to 2.0' SAND (SW), pale yellow (5Y 8/2), dry, becoming more moist with depth, fine to coarse grained sand (calcareous), few organics	
0.5	0.5 - 1.5	12	S-2			
1						
1.5	1.5 - 2	6	S-3			Collect sample VEECA-1SB02-1H02-0211 at 0955 for metals, explosives, and pH. Collect sample VEECA-1SB02-1H02P-0211 at 0955 for metals and explosives.
2					Total Depth @ 2.0 ft bls	

Sampler Signature: **Antonio Luna** Date: **02/08/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-1SB02	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Beach Decision Unit 1 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/08/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-1DU01 SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Beach Decision Unit 1 DATE: 02/07/11

WEATHER: Clear, 78°F, 15-20 kts SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless Steel Spoons

WATER LEVEL: Not encountered START : 1245 END : 1332 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006793.59 E: 258986.56	NW to SE	0 - 2"	100	SAND (SW), pale yellow, dry, loose, fine sand, few organics	Beach berm is highly vegetated with ground vines and low brush. Collect sample VEECA-1SMI01-0211 at 1330 for explosives, metals, and pH. Collect sample VEECA-1SMI01T-0211 at 1331 for explosives and metals. Collect sample VEECA-1SMI01TT-0211 at 1332 for explosives and metals.

Sampler Signature: **Antonio Luna** Date: **02/04/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-1DU01	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Beach Decision Unit 1 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/04/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-1DU02	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Beach Decision Unit 1 DATE: 02/07/11

WEATHER: Overcast, 77°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1215 END : 1245 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006611.76 E: 259168.64	NW to SE	0 - 2"	100	SAND (SW), pale yellow, dry, loose, fine sand, few organics	Beach berm is highly vegetated with ground vines and low brush. Collect sample VEECA-1SMI02-0211 at 1245 for explosives, metals, and pH.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-1DU02	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Beach Decision Unit 1 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB01	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Overcast, 73° F, 5-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 3.0 ft bls START : 1000 END : 1015 LOGGER : A. Luna

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	HA-1		0.0 to 0.1' Organic Topsoil (OL) 0.1 to 0.5' SAND (SW), light brown, moist, fine to coarse grained sand, calcareous	Surface bedrock covers most of area.
0.5	0.5 - 1	6	HA-2		0.5 to 3.0' SAND (SW), light brown, moist, fine to coarse grained sand, calcareous, saturated at 3.0 ft bls	
1	1 - 1.5	6	HA-3			
1.5	1.5 - 2	6	HA-4			Collected sample VEECA-2SB01-0103-0211 @ 1015 for metals and explosives. EPA performed a split sample.
2	2 - 2.5	6	HA-5			
2.5	2.5 - 3	6	HA-6			
3						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB01	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Overcast, 73° F, 5-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 3.0 ft bls START : 1000 END : 1015 LOGGER : A. Luna

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
	3 - 3.5	6	HA-7		3.0 to 3.5' SAND (SW), white, saturated, fine to coarse grained sand, calcareous	
3.5					Total Depth @ 3.5 ft bls	

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB01	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB02	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Overcast, humid, 5 kt E, 82° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0900 END : 0915 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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	HA-1		0.0 to 1.0' PEATY SAND (SW), brown, dry, loose, fine grained sand, lots of organics	Surface bedrock covers most of area.
0.5	0.5 - 1	6	HA-2			
1	1 - 1.5	6	HA-3		1.0 to 2.8' SAND WITH GRAVEL (SW), mottled white and light yellow, dry, dense, fine to coarse grained sand, fine to coarse subangular to subrounded limestone gravel	Collected sample VEECA-2SB02-0103-0211 @ 0915 for metals and explosives. Collected sample VEECA-2SB02P-0103-0211 @ 0915 for metals and explosives.
1.5	1.5 - 2	6	HA-4			
2	2 - 2.5	6	HA-5			
2.5	2.5 - 2.8	6	HA-6			
3					Refusal @ 2.8 ft bls	

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB02	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB03	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Overcast, 73° F, 5-10 kts DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0930 END : 0940 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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	HA-1		0.0 to 0.5' SILTY SAND WITH PEAT (SW), brown, dry, non-plastic, non-cohesive, fine to medium grained sand, coarsening downward	Surface bedrock covers most of area.
0.5	0.5 - 1	6	HA-2		0.5 to 1.0' GRAVELLY SAND WITH COBBLES AND BEDROCK (SW), brown, dry, medium density, fine to medium grained sand, fine to coarse grained angular to subrounded gravel (limestone)	Collected sample VEECA-2SB03-0001-0211 @ 0940 for metals and explosives.
1					Refusal @ 1.0 ft bls	
1.5						
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB03	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB04	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.7 ft bls START : 1210 END : 1240 LOGGER : A. Luna

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 - 0.5	6	HA-1		0.0 to 0.33' SAND (SW), light brown, dry, fine to medium grained sand (calcareous), trace organics	Surface bedrock covers most of area.
0.5	0.5 - 1	6	HA-2		0.33 to 5.0' SAND (SW), light brown, dry, fine to medium grained sand (calcareous with shells)	
1	1 - 1.5	6	HA-3			
1.5	1.5 - 2	6	HA-4			
2	2 - 2.5	6	HA-5			
2.5	2.5 - 3	6	HA-6			
3						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB04	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.7 ft bls START : 1210 END : 1240 LOGGER : A. Luna

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
	3 - 3.5	6	HA-7			
3.5	3.5 - 4	6	HA-8			
4	4 - 4.5	6	HA-9			
4.5	4.5 - 5	6	HA-10			
5	5 - 5 5	6	HA-11		5.0 to 7.0 SAND (SW), light brown, dry, fine to medium grained sand (calcareous with shells), moist	Collected sample VEECA-2SB04-0507-0211 @ 1240 for metals and explosives. Split sample with EPA.
5.5	5.5 - 6	6	HA-12			
6						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB04	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.7 ft bls START : 1210 END : 1240 LOGGER : A. Luna

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
	6 - 6.5	6	HA-13			
6.5	6.5 - 7	6	HA-14			
7	7 - 7.5	6	HA-15		7.0 to 7.5 SAND (SW), light brown, dry, fine to medium grained sand (calcareous with shells), saturated	
7.5					Total depth = 7.5 ft bls	
8						
8.5						
9						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB04	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB05	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 7.0 ft bls START : 1410 END : 1440 LOGGER : A. Luna

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	HA-1		0.0 to 0.33' SAND (SW), light brown, dry, surface organics	
0.5	0.5 - 1	6	HA-2			
1	1 - 1.5	6	HA-3			
1.5	1.5 - 2	6	HA-4			
2	2 - 2.5	6	HA-5			
2.5	2.5 - 3	6	HA-6			
3						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB05	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 7.0 ft bls START : 1410 END : 1440 LOGGER : A. Luna

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
3.5	3 - 3.5	6	HA-7			
4	3.5 - 4	6	HA-8			
4.5	4 - 4.5	6	HA-9			
5	4.5 - 5	6	HA-10			
5.5	5 - 5 5	6	HA-11			Collected sample VEECA-2SB05-0507-0211 @ 1440 for metals and explosives.
6	5.5 - 6	6	HA-12			

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB05	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 82° F, 18 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 7.0 ft bls START : 1410 END : 1440 LOGGER : A. Luna

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
	6 - 6.5	6	HA-13			
6.5	6.5 - 7	6	HA-14			
7				▼	Total depth = 7.0 ft bls	
7.5						
8						
8.5						
9						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB05	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB06	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 12-18 kts E, 85° F DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.8 ft bls START : 1300 END : 1325 LOGGER : A. Luna

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	HA-1		0.0 to 0.33' SAND (SW), light brown, dry, loose, fine to medium grained sand, trace organics	
0.5					0.33 to 5.0' SAND (SW), light brown, dry, loose, medium grained sand, becoming moist with depth	
	0.5 - 1	6	HA-2			
1						
	1 - 1.5	6	HA-3			
1.5						
	1.5 - 2	6	HA-4			
2						
	2 - 2.5	6	HA-5			
2.5						
	2.5 - 3	6	HA-6			
3						

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB06	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 12-18 kts E, 85° F DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.8 ft bls START : 1300 END : 1325 LOGGER : A. Luna

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
3.5	3 - 3.5	6	HA-7			
4	3.5 - 4	6	HA-8			
4.5	4 - 4.5	6	HA-9			
5	4.5 - 5	6	HA-10			
5.5	5 - 5 5	6	HA-11		5.0 to 7.0' SAND (SW), light brown, dry, loose, medium grained sand, moist	Collected samples VEECA-2SB06-0507-0211, VEECA-2SB06-0507-0211-MS, and VEECA-2SB06-0507-0211-SD at 1325 for metals and explosives.
6	5.5 - 6	6	HA-12			

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB06	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/09/11

WEATHER: Clear, 12-18 kts E, 85° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.8 ft bls START : 1300 END : 1325 LOGGER : A. Luna

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
	6 - 6.5	6	HA-13			
6.5	6.5 - 7	6	HA-14			
7	7 - 7.5	6	HA-15		7.0 to 7.5' SAND (SW), light brown, dry, loose, medium grained sand, saturated	
7.5					Total depth = 7.5 ft bls	
8						
8.5						
9						

Sampler Signature: **Antonio Luna** Date: **02/09/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB06	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/09/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/9/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB07	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Partly cloudy, 85° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 2.5 ft bls START : 1035 END : 1110 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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
0.5	0 - 0.5	6	HA-1		0.0 to 1.0' PEATY SAND (SW), brown, dry, fine to medium grained sand	
1	0.5 - 1	6	HA-2			Collected sample VEECA-2SB07-0H2H-0211 @ 1110 for metals and explosives.
1.5	1 - 1.5	6	HA-3		1.0 to 3.0' SILTY/CLAYEY SAND (SW-SM), mottled white and orange, moist to 2.5 ft, saturated at 2.5 ft, fine to coarse grained sand	
2	1.5 - 2	6	HA-4			
2.5	2 - 2.5	6	HA-5	▼		
3	2.5 - 3	6	HA-6		Total depth = 3.0 ft bls	

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB07	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB08	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Partly cloudy, 85° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 4.0 ft bls START : 1130 END : 1200 LOGGER : A. Luna

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	HA-1		0.0 to 2.0' PEATY SAND (SW), dark brown, dry, loose, fine to medium grained sand	
0.5	0.5 - 1	6	HA-2			
1	1 - 1.5	6	HA-3			
1.5	1.5 - 2	6	HA-4			
2	2 - 2.5	6	HA-5		2.0 to 4.0' SILTY CLAYEY SAND (SM), white and yellowish orange mottled, fine to coarse grained sand, non-plastic to low plasticity, non-cohesive	Collected sample VEECA-2SB08-0204-0211 at 1200 for metals and explosives.
2.5	2.5 - 3	6	HA-6			
3						

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB08	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Partly cloudy, 85° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 4.0 ft bls START : 1130 END : 1200 LOGGER : A. Luna

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
	3.0 - 3.5	6	HA-7			
3.5	3.5 - 4	6	HA-8			
4	4 - 4.5	6	HA-9		4.0 to 4.5' SILTY CLAYEY SAND (SM), white and yellowish orange mottled, fine to coarse grained sand, non-plastic to low plasticity, non-cohesive, wet	
4.5					Total depth = 4.5 ft bls	
5						
5.5						
6						

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB08	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB09	SHEET 1 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Clear, 86° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.5 ft bls START : 1300 END : 1315 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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
0.5	0 - 0.5	6	HA-1		0.0 to 1.0' PEATY SAND (SW), mottled dark brown and brown, fine grained sand	
1	0.5 - 1	6	HA-2			
1.5	1 - 1.5	6	HA-3		1.0 to 6.5' SILTY SAND (SM), mottled white and yellowish red, moist, fine to coarse grained sand, non plastic to low plasticity, non-cohesive	
2	1.5 - 2	6	HA-4			
2.5	2 - 2.5	6	HA-5			
3	2.5 - 3	6	HA-6			

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB09	SHEET 2 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Clear, 86° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.5 ft bls START : 1300 END : 1315 LOGGER : A. Luna

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
3.5	3.0 - 3.5	6	HA-7			
4	3.5 - 4	6	HA-8			
4.5	4 - 4.5	6	HA-9			
5	4.5 - 5	6	HA-10			Collected sample VEECA-2SB09-4H6H-0211 @ 1315 for metals and explosives. Collected sample VEECA-2SB09P-4H6H-0211 @ 1315 for metals and explosives.
5.5	5 - 5.5	6	HA-11			
6	5.5 - 6	6	HA-12			

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB09	SHEET 3 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/08/11

WEATHER: Clear, 86° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 6.5 ft bls START : 1300 END : 1315 LOGGER : A. Luna

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
	6 - 6.5	6	HA-13			
6.5						
	6.5 - 7	6	HA-14		6.5 to 7.0' SILTY SAND (SM), mottled white and yellowish red, wet, fine to coarse grained sand, non-plastic to low plasticity, non-cohesive	
7						
					Total depth = 7.0 ft bls	
7.5						
8						
8.5						
9						

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB09	SHEET 4 OF 4

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/8/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB10	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 86° F, 5-7 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 4.0 ft bls START : 1245 END : 1315 LOGGER : A. Luna

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
0.5	0 - 0.5	6	HA-1		0.0 to 0.5' PEATY SAND (SW), dark brown, dry, fine grained sand, organics	
1	0.5 - 1	6	HA-2		0.5 to 3.0' SILTY SAND (SM), brown to tan, dry to damp, fine to medium grained sand	
1.5	1 - 1.5	6	HA-3			
2	1.5 - 2	6	HA-4			
2.5	2 - 2.5	6	HA-5			Collected sample VEECA-2SB10-0204-0211 at 1315 for metals and explosives. EPA took split sample.
3	2.5 - 3	6	HA-6			

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB10	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 86° F, 5-7 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 4.0 ft bls START : 1245 END : 1315 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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
	3.0 - 3.5	6	HA-7		3.0 to 4.0' SILT (ML), yellowish orange, moist, non-plastic, non- cohesive	
3.5	3.5 - 4	6	HA-8			
4				▼		
	4 - 4.5	6	HA-9		4.0 to 4.5' SILT/CLAY (Ml-CL), yellowish orange, wet, moderately plastic to highly plastic, non-cohesive	
4.5					Total depth = 4.5 ft bls	
5						
5.5						
6						

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB10	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/10/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Collected split sample for EPA

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB11	SHEET 1 OF 5

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/11/11

WEATHER: Clear, 80° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 9.5 ft bls START : 0845 END : 0940 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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
0.5	0 - 0.5	6	HA-1		0.0 to 1.0' PEAT WITH SAND (OL), dark brown, dry, loose, fine sand	
1	0.5 - 1	6	HA-2			
1.5	1 - 1.5	6	HA-3		1.0 to 1.5' PEATY SAND (SW), brown, dry, loose, fine to medium grained sand	
2	1.5 - 2	6	HA-4		1.5 to 2.0' PEATY SAND (SW), light brown, little peat, dry, loose, fine to medium grained sand	
2.5	2 - 2.5	6	HA-5		2.0 to 2.5' SAND (SW), brown, little peat, fine grained sand, dry	
3	2.5 - 3	6	HA-6		2.5 to 3.0' SAND (SW), brown, little peat, fine grained sand, dry, most dense at 2.7' bgs	

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB11	SHEET 2 OF 5

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/11/11

WEATHER: Clear, 80° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 9.5 ft bls START : 0845 END : 0940 LOGGER : A. Luna

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 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
3.5	3.0 - 3.5	6	HA-7		3.0 to 3.5' SAND (SW), brown, little peat, fine to coarse grained sand, moist, few gravel	
4	3.5 - 4	6	HA-8		3.5 to 4.0' SAND (SW), light brown to yellowish brown, little peat, fine to coarse grained sand, moist, few gravel	
4.5	4 - 4.5	6	HA-9		4.0 to 8.5' SAND (SW), mottled light brown to yellowish brown, few peat, fine to coarse grained sand, moist, few gravel	
5	4.5 - 5	6	HA-10			
5.5	5 - 5.5	6	HA-11			
6	5.5 - 6	6	HA-12			

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB11	SHEET 3 OF 5

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/11/11

WEATHER: Clear, 80° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 9.5 ft bls START : 0845 END : 0940 LOGGER : A. Luna

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
6.5	6 - 6.5	6	HA-13			
7	6.5 - 7	6	HA-14			
7.5	7 - 7.5	6	HA-15			
8	7.5 - 8	6	HA-16			Collected sample VEECA-2SB11-7H9H-0211 at 0940 for metals and explosives.
8.5	8 - 8.5	6	HA-17			
9	8.5- 9	6	HA-18		8.5 to 9.5' SILT (SM), light brown to light yellowish brown, damp to moist, with gravel, fine to coarse grained subrounded to subangular gravel	

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB11	SHEET 4 OF 5

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/11/11

WEATHER: Clear, 80° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 9.5 ft bls START : 0845 END : 0940 LOGGER : A. Luna

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
	9 - 9.5	6	HA-19			
9.5				▼		
	9.5 - 10	6	HA-20			
					Total depth = 9.8 ft bls	
10						
10.5						
11						
11.5						
12						

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB11	SHEET 5 OF 5

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/11/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB12	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/11/11

WEATHER: Clear, 80° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 2.5 ft bls START : 0800 END : 0827 LOGGER : A. Luna

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	HA-1		0.0 to 1.0' PEAT (OL), dark brown, dry to moist, loose, some fine grained sand	
0.5	0.5 - 1	6	HA-2			Collected sample VEECA-2SB12-0H2H-0211 @ 0835 for metals and explosives.
1	1 - 1.5	6	HA-3		1.0 to 2.0' SILTY SAND, yellowish orange, moist to damp, soft, fine to coarse grained, calcareous sand, slightly plastic, non-cohesive	
1.5	1.5 - 2	6	HA-4			
2	2 - 2.5	6	HA-5	▼	2.0 to 2.5' SILT WITH GRAVEL (ML), moist, medium plasticity, non-cohesive	
2.5	2.5 - 3	6	HA-6		2.5 to 3.0' SILT WITH GRAVEL (ML), yellow, wet, medium plasticity, cohesive	
3					Total depth = 3.0 ft bls	

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB12	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/11/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB13	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 81° F DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0935 END : 0955 LOGGER : A. Luna

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	HA-1		0.0 to 0.5' SAND WITH PEAT (SW), brown, dry, loose, fine to medium grained sand	Collected sample VEECA-2SB13-000H-0211 at 0955 for metals and explosives. EPA took split sample. Surface bedrock covers most of area.
0.5					Refusal @ 0.5 ft bls	
1						
1.5						
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB13	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/10/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Collected split sample for EPA

Bedrock @ 6" bgs, needed several collocated samples to make volume for all jars

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB14	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 80° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0900 END : 0925 LOGGER : A. Luna

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
0.5	0 - 0.5	6	HA-1		0.0 to 1.5' SAND WITH PEAT (SW), brown, dry, loose, fine to medium grained sand	Surface bedrock covers most of area.
1	0.5 - 1	6	HA-2			
1.5	1 - 1.5	6	HA-3			
2	1.5 - 2	6	HA-4		1.5 to 3.5' SAND (SW), yellow, dry, medium dense to dense, fine to coarse grained sand with gravel, fine to coarse grained subrounded to subangular gravel	Collected sample VEECA-2SB14-1H3H-0211 at 0925 for metals and explosives.
2.5	2 - 2.5	6	HA-5			
3	2.5 - 3	6	HA-6			

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB14	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 80° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0900 END : 0925 LOGGER : A. Luna

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
	3 - 3.5	6	HA-7			
3.5					Refusal @ 3.4 ft bls	
4						
4.5						
5						
5.5						
6						

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB14	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/10/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB15	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHER: Clear, 80° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 5.5 ft bls START : 1010 END : 1150 LOGGER : A. Luna

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	HA-1		0.0 to 1.7' PEAT AND SAND (SW), brown, dry, fine grained sand, roots and other organics	This is the 2nd borehole; 1st borehole had refusal @ 0.17 ft bls Surface bedrock covers most of area.
0.5	0.5 - 1	6	HA-2			
1	1 - 1.5	6	HA-3			
1.5	1.5 - 2	6	HA-4		1.7 to 2.5' SAND (SW), light yellow, becoming yellow with depth, dry, sand is limestone weathered in situ	
2	2 - 2.5	6	HA-5			
2.5	2.5 - 3	6	HA-6		2.5 to 3.5' SAND/SILT (SM-ML), yellowish brown, dry, fine grained sand and silt	
3						

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB15	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit DATE: 02/10/11

WEATHI WEATHER: Clear, 80° F, 10-15 kts E DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 5.5 ft bls START : 1010 END : 1150 LOGGER : A. Luna

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
	3.0 - 3.5	6	HA-7			
3.5	3.5 - 4	6	HA-8		3.5 to 6.0' SILT (ML), mottled yellowish white and yellowish brown, moist, non-plastic, non-cohesive	
4	4 - 4.5	6	HA-9			Collected sample VEECA-2SB15-0406-0211 @ 1150 for metals and explosives.
4.5	4.5 - 5	6	HA-10			
5	5 - 5.5	6	HA-11			
5.5	5.5 - 6	6	HA-12			
6					Refusal @ 6.0 ft bls	

Sampler Signature: **Antonio Luna** Date: **2/10/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-2SB15	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/10/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sample location was moved to a location where soil could be collected, the first location had soil only 2" deep. Location was GPS'ed by Kenji Butler.

Sampler Signature: **Antonio Luna** Date: **2/11/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-2DU01	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lowland Decision Unit 2 DATE: 02/04/11

WEATHER: Overcast, 80°F, 15-20 kts SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampler and stainless steel spoons

WATER LEVEL: Not encountered START : 0930 END : 1000 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006917.09 E: 258834.48	North to South	0 - 2"	30	SAND WITH PEAT (SW), brown (7.5YR 4/4), dry, fine grained sand, lots of organics, few fine to coarse grained calcareous gravel, trace silt	Widely and highly vegetated with multiple types of plants above 6", soil is 0 to >5" with few outcrops of bedrock, limestone is yellow and white mottled, non-fossiliferous, few land snails Collect sample VEECA-2SMI01-0211 at 1000.

Sampler Signature: **Antonio Luna** Date: **2/4/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-2DU01	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/04/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **2/4/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-2DU02	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lowland Decision Unit 2 DATE: 02/14/11

WEATHER: Overcast, 77°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0840 END : 0900 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006665.68 E: 259043.19	North to South	0 - 2"	30	SAND (SW), gray, dry, fine to medium grained, with organics	Low brush to medium high density brush on sand bar between beach and lagoon Collect sample VEECA-2SMI02-0211, VEECA-2SMI02-0211MS, and VEECA-2SMI-02-0211SD at 0900.

Sampler Signature: **Antonio Luna** Date: **2/14/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-2DU02	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **2/14/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-2DU03	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lowland Decision Unit 2 DATE: 02/07/11

WEATHER: Overcast to partly cloudy, 77°F, 18 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0830 END : 0855 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006645.55 E: 258830.12	North to South	0 - 2" 3 - 5'	25	SAND WITH GRAVEL AND PEAT (SW), strong brown (7.5YR 4/6), dry to moist, fine to coarse grained sand with fine to coarse grained angular gravel	High vegetation cover, road through most of site, no rock outcrops Collect sample VEECA-2SMI03-0211 at 0855 for explosives, metals, and pH.

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-2DU03	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-2DU04 SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lowland Decision Unit 2 DATE: 02/07/11

WEATHER: Overcast, 18-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1030 END : 1055 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006550.00 E: 259105.00	East to West	0 - 2"	25	SAND (SW), brown (7.5YR 4/3), dry, loose, fine to coarse grained sand, fine to coarse grained angular gravel	Medium vegetation, no rock outcrops Collect sample VEECA-2SMI04-0211 at 1055 for explosives, metals, and pH.

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-2DU04	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-2DU05	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lowland Decision Unit 2 DATE: 02/07/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1130 END : 1200 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006505.00 E: 259195.00	East to West	0 - 2" 3 - 7	25	SAND(SW), dark brown (7.5YR 3/2) to light greenish gray (Gley 1 10YR 7/1), dry, fine to medium grained sand, few fine grained gravel	High vegetation coverage, few rock outcrops, much sandier toward beach Collect sample VEECA-2SMI05-0211 at 1200.

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-2DU05	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lowland Decision Unit 2 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **2/7/2011**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB01	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/11/11

WEATHER: Clear, breezy, 85°F DRILLING CONTRACTOR CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 1050 END : 1055 LOGGER : A. Luna

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	HA-1		0.0 to 2.0' SAND (SW), gray, moist to 1' then wet, fine to coarse grained sand	Collected sample VEECA-3SB01-0001-0211 @ 1055 for explosives, metals, and pH.
0.5						
	0.5 - 1	6	HA-2			
1						
	1 - 1.5	6	HA-3			
1.5						
	1.5 - 2	6	HA-4			
2					Total depth @ 2.0 ft bls	
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB01	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe DU 3 DATE: 02/11/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB02	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/11/11

WEATHER: Clear, 85°F, breezy DRILLING CONTRACTOR : CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 1000 END : 1025 LOGGER : A. Luna

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	HA-1		0.0 to 0.8' SANDY CLAY (CL), dark brown, moist	Collected sample VEECA-3SB02-0001-0211 at 1025 for metals, explosives, and pH.
0.5						Collected sample VEECA-3SB02P-0001-0211 at 1025 for metals and explosives.
	0.5 - 1	6	HA-2		0.8 to 1.0' SILT (ML), yellowish orange, moist, low plasticity, non-cohesive	
1						Tried 3 times to get past 1.0' bgs
					Refusal @ 1.0 ft bls	
1.5						
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB02	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/11/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB03	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/10/11

WEATHER: Clear, 86˚F, 5-10 kts E DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 1350 END : 1410 LOGGER : A. Luna

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	HA-1		0.0 to 1.0' SAND (SW), dark brown, moist, fine to coarse grained sand, many organics	Collected sample VEECA-3SB03-0002-0211 at 1410 for metals, explosives, and pH. Collected split sample for EPA.
0.5	0.5 - 1	6	HA-2			
1	1 - 1.5	6	HA-3		1.0 to 2.0' SILT (ML), yellowish orange, moist, non-plastic to low plasticity, non-cohesive	
1.5	1.5 - 2	6	HA-4			
2					Total depth = 2.0 ft bls	
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/10/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB03	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/10/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB04	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Overcast, 76˚F, 5-20 kts E DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 1.5 ft bls START : 0820 END : 0830 LOGGER : A. Luna

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	HA-1		0.0 to 1.5' SAND (SW), gray, moist, fine to medium grained sand	
0.5						
	0.5 - 1	6	HA-2			Collected sample VEECA-3SB04-001H-0211 at 0830 for explosives, metals, and pH. Collected sample VEECA-3SB04-001H-0211-MS at 0830 for explosives and metals.
1						
	1 - 1.5	6	HA-3			Collected sample VEECA-3SB04-001H-0211-SD at 0830 for explosives and metals. No evidence of land crabs at this location.
1.5					Total depth @ 1.5 ft bls	
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB04	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB05	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/11/11

WEATHER: Sunny, 86°F, 5-10 kts E DRILLING CONTRACTOR : CH2M HILL

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 1430 END : 1440 LOGGER : A. Luna

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	HA-1		0.0 to 2.0' SAND (SW), brown to yellowish brown, dry to moist, fine to medium grained calcareous sand	Area to the east is highly vegetated - fiddler crabs near lagoon to the west
0.5						
	0.5 - 1	6	HA-2			Collected sample VEECA-3SB05-0002-0211 at 1440 for metals, explosives, and pH. Collected split sample for EPA.
1						
	1 - 1.5	6	HA-3			
1.5						
	1.5 - 2	6	HA-4			
2					Total depth = 2.0 ft bls	
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-3SB05	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Lagoon Fringe Decision Unit 3 DATE: 02/11/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-3DU01	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Overcast, 80°F, 15-20 kts SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1220 END : 1300 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006898.16 E: 258857.77	North to South	0 - 2"	25	GRAVELLY SAND (SW), dark brown, gray and yellowish red, moist to wet, fine to coarse sand with fine to coarse subrounded to subangular gravel	Button mangroves, thorn brush, medium to high brush, hermit crabs, fiddler crabs, 14 land crabs, 16 land crab mounds (no holes) Collect sample VEECA-3SMI01-0211 at 1300 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-3DU01	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-3DU02	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Overcast, 77°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0840 END : 0900 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006695.80 E: 258835.59	North to South	0 - 2" 3 - 7'	25	SAND (SW), dark brown to brown and black, moist to wet, fine to medium sand	Button mangroves, thorn brush, medium to high brush, hermit crabs, fiddler crabs Collect sample VEECA-3SMI02-0211 at 0900 for metals, explosives, and pH. Collect samples VEECA-3SMI02-0211MS and VEECA-3SMI-02-0211SD at 0900 for metals and explosives.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-3DU02	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-3DU03	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Overcast to partly cloudy, 77°F, 18 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1100 END : 1125 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006598.23 E: 258952.00	North to South	0 - 2" 3 - 5'	25	SAND (SW), brown to black and white yellowish red, moist, fine to medium sand	Button mangroves, thorn brush, medium to high brush, hermit crabs, fiddler crabs, one land crab Collect sample VEECA-3SMI03-0211 at 1125 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-3DU03	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-3DU04	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Overcast, 18-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0915 END : 1035 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006636.48 E: 259034.36	East to West	0 - 2"	25	SAND (SW), black/gray, yellowish red/white, moist to wet, fine to medium sand	Mangroves, thorny brush, hermit and fiddler crabs Collect triplicate sample VEECA-3SMI04-0211 at 1035

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-3DU04	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-3DU05 SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0915 END : 0950 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006750.49 E: 258945.76	East to West	0 - 2" 3 - 7	25	SAND (SW), black/gray, yellowish red/white, moist to wet, fine to medium sand	Mangroves, thorny brush, hermit and fiddler crabs Collect sample VEECA-3SMI05-0211 at 0950 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-3DU05	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Lagoon Fringe Decision Unit 3 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-4SS01	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Upland Decision Unit 4 DATE: 02/08/11

WEATHER: Partly cloudy, 18-20 knots E, 78°F DRILLING CONTRACTOR CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: Not encountered START : 0820 END : 0830 LOGGER : A. Luna

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
0.5	0 - 1	12	HA-1		0 - 1': SILTY SAND (SM), dark red (10R 3/6), dry, very loose, fine to medium grained sand, few subangular coarse gravel, non-cohesive, non-plastic	Collected sample VEECA-4SS01-0001-0211 @ 0830 for metals and pH. Collected sample VEECA-4SS01-0001-0211-MS @ 0830 for metals. Collected sample VEECA-4SS01-0001-0211-SD @ 0830 for metals. Collected sample VEECA-4SS01P-0001-0211 @ 0830 for metals. EPA took split sample from location - 10 oz. jar for metals.
1					Total depth = 1 ft bls	
1.5						
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/08/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-4SS01	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Upland Decision Unit 4 DATE: 02/08/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/11/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-4SB01	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Upland Decision Unit 4 DATE: 02/18/11

WEATHER: Partly cloudy, recent rain, no wind, 79˚F DRILLING CONTRACTOR CH2M HILL, Inc.

DRILLING METHOD AND EQUIPMENT USED : Hand auger

WATER LEVEL: 1.5 ft bls START : 0800 END : 0830 LOGGER : A. Luna

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	HA-1		0.0 to 1.5' GRAVELY SAND (SW), gray, moist, fine to coarse grained sand, fine to coarse angular to rounded gravel, coral gravel, saturated at 1.5 ft bls	Collected sample VEECA-4SB01-001H-0211 @ 0830 for explosives, metals, and pH. Located in highest land crab concentration area next to still pond.
0.5						
	0.5 - 1	6	HA-2			
1						
	1 - 1.5	6	HA-3			
1.5						
					Total depth = 1.5 ft bls	
2						
2.5						
3						

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	BORING NUMBER VEECA-4SB01	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION : Upland Decision Unit 4 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-2

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU01	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/02/11

WEATHER: Clear, 80°F, sunny SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1130 END : 1215 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2007030.00 E: 258868.54	North to South	0 - 2"	25	PEAT (OL), dark to medium reddish brown, dry, loose, few fine sand	Heavily vegetated area with croton discolor, some areas with exposed limestone bedrock Collect sample VEECA-4SMI01-0211 at 1215 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/02/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU01	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/02/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/02/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU02	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/02/11

WEATHER: Clear, 80°F, sunny SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1020 END : 1100 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2007030.00 E: 259000.00	North to South	0 - 2"	30	SAND with Peat (SW), dark brown to pale yellow, dry, loose, fine to coarse calcareous sand, > 30% peat	Many exposed bedrock areas, peat and sand found in vegetated areas, no soil on exposed highly weathered limestone bedrock Collected triplicate sample VEECA-4SMI02-0211, VEECA-4SMI02T-0211, and VEECA-4SMI02TT-0211 at 1100 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **2/2/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU02	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/02/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/02/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU03	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/07/11

WEATHER: Overcast to partly cloudy, 77°F, 18 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 908 END : 0930 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006532.82 E: 258817.30	North to South	0 - 2"	25	SAND WITH GRAVEL (SW), reddish brown (5YR 5/3), dry to moist, fine to coarse sand with fine to coarse angular to subangular gravel	Highly vegetated scrub brush with thorns, high grasses. Collect sample VEECA-4SMI03-0211 at 0930 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/07/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU03	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/07/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU04	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

WEATHER: Overcast, 18-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1100 END : 1140 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006361.74 E: 258834.17	North to South	0 - 2"	25	SILTY SAND(SM), dark brown to light brown, dry, loose, fine to medium sand	Heavily vegetated, high vegetation, limestone outcrops and very steep terrain, > 50 land crab holes Collect sample VEECA-4SMI04-0211 at 1140 for metals, explosives, and pH. Collect sample VEECA-4SMI04-0211MS and VEECA-4SMI04-0211SD at 1140 for metals and explosives.

Sampler Signature: **Antonio Luna** Date: **02/15/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU04	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/15/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU05	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/07/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0945 END : 1010 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006361.74 E: 258834.17	East to West	0 - 2" 3 - 7	25	SAND with Gravel (SW), brown (7.5YR 4/2), dry, loose, fine to coarse grained sand, fine to coarse angular to subangular gravel, little peat	Low-lying vegetation, very sandy, > 50 land crab holes Collect sample VEECA-4SMI05-0211 at 1010 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/07/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU05	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/07/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/07/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU06	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

WEATHER: Clear, 81°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1015 END : 1045 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006415.00 E: 258925.00	East to West	0 - 2" 3 - 7	25	SILTY SAND (SW), brown, dry, loose fine sand, few fine angular gravel	Low vegetation coverage, limestone rock outcrops are fossiliferous with coral Collect sample VEECA-4SMI06-0211 at 1045 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/15/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU06	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/15/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU07	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1230 END : 1255 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006475.00 E: 259060.00	North to South	0 - 2"	30	SILTY SAND (SM), dark brown to brown, dry, loose, fine to medium grained sand, non-plastic, non-cohesive, few fine grained angular gravel	Low to medium height brush, lots of thorny brush and croton discolor, grasses Collect sample VEECA-4SMI07-0211 at 1255 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/15/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU07	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/15/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU08	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/14/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1330 END : 1350 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006400.00 E: 259105.00	East to West	0 - 2"	25	SILTY SAND with Peat (SM), orangish brown, dry to moist, non-plastic, non-cohesive, fine grained sand, high organic content	Sparse low to medium height brush and thorny brush Collect sample VEECA-4SMI08-0211 at 1350 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/14/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU08	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/14/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/14/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU09	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

WEATHER: Clear, 79°F, 5-10 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 0905 END : 0955 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006385.00 E: 259195.00	East to West	0 - 2" 3 - 7	25	SILTY SAND (SM), dark brown, dry, fine to medium grained sand, high organic content	Heavily vegetated with medium to tall height and some canopy Collect triplicate sample VEECA-4SMI09-0211, VEECA-4SMI09T-0211 and VEECA-4SMI04TT-0211 at 0955 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/15/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU09	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/15/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU10	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

WEATHER: Clear, 79°F, 5-10 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 0825 END : 0845 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006292.14 E: 259250.12	East to West	0 - 2"	30	SILTY SAND (SW-SM), dark brown, dry, fine to medium grained sand, few fine to coarse angular gravel	Low height vegetation with crotus dicolor and thorny brush, rock outcrops Collect sample VEECA-4SMI10-0211 at 0845 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/15/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU10	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/15/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/15/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU11	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

WEATHER: Partly cloudy, 83°F, 15-20 kts E SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1250 END : 1320 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006475.00 E: 259300.00	East to West	0 - 2"	25	SAND with Peat (SW), dark yellowish brown (10 YR 4/4), dry, fine to coarse grained sand, few fine to coarse angular gravel	Heavy vegetation cover, much more topsoil than the eastern area of the ECA Collect triplicate sample VEECA-4SMI11-0211, VEECA-4SMI11T-0211, VEECA-4SMI11TT-0211 at 1320 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/03/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU11	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/03/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU12	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/04/11

WEATHER: Overcast, 78°F, 20-25 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 0840 END : 0906 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006400.00 E: 259465.00	East to West	0 - 2"	30	PEAT with Sand (OL), dusky red (2.5YR 3/2), dry, fine to coarse calcareous sand, little fine to coarse angular gravel	Very rocky terrain, highly vegetated with crotus discolor, thorny plants and palms Collect sample VEECA-4SMI12-0211 at 0906 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/04/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU12	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/04/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/04/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU13	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

WEATHER: Clear, 79°F, 20 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1050 END : 1116 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006535.00 E: 259525.00	East to West	0 - 2"	30	PEAT with Sand (OL), organic soil with fine to coarse sand and fine to coarse angular limestone gravel	Low brush cover over vesicular limestone bedrock Collect sample VEECA-42SMI13-0211 at 1116 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/03/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU13	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/03/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU14	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

WEATHER: Clear, 79°F, 20 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 1010 END : 1035 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006520.00 E: 259735.00	East to West	0 - 2"	30	PEAT with Sand (OL), reddish brown (5YR 5/3), to dark reddish brown (5YR 3/2) , organic soil with fine to coarse sand and fine to coarse angular coral and limestone gravel	Highly vegetated with crotus discolor shrubs and vuggy limestone bedrock at surface, loose cobbles, metal debris Collect sample VEECA-4SMI14-0211 at 1035 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/03/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU14	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/03/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-4DU15	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

WEATHER: Clear, 79°F, 20 knot winds SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampling and spoons

WATER LEVEL: Not encountered START : 910 END : 0940 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2006595.00 E: 259930.00	North to South	0 - 2"	25	PEAT with Sand (OL), dark reddish brown (5YR 3/3), dry, fine to coarse calcareous with fine to coarse angular calcareous gravel	Vegetation overlying exposed weathered limestone bedrock; vegetation varies from sparse to thick with crotus discolor and low lying shrubs Collect sample VEECA-4SMI15-0211 at 0940 for metals, explosives, and pH.

Sampler Signature: **Antonio Luna** Date: **02/03/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-4DU15	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Upland Decision Unit 4 DATE: 02/03/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/03/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU01	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

WEATHER: Clear, 85°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampler and stainless steel spoons

WATER LEVEL: Not encountered START : 1430 END : 1530 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2003095.48 E: 242930.39	Radial	0 - 2"	40 spoons 120 mist samples	PEAT (OL), reddish brown, dry, few fine sand and coarse subangular to subrounded gravel	High vegetation with palms, rock exposures Collect sample VEECA-6SMI01-0211 at 1530 for metals.

Sampler Signature: **Antonio Luna** Date: **02/16/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU01	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/16/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU02	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

WEATHER: Clear, 85°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 1230 END : 1445 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2002867.78 E: 242784.88	Radial	0 - 2"	Q1 - 121 Q2 - 90 Q3 - 180	PEAT (OL), reddish brown, dry, few fine sand and fine angular gravel	Highly vegetated, rock outcrops Collected triplicate sample VEECA-6SMI02-0211, VEECA-6SMI02T-0211, and VEECA-6SMI02TT-0211 at 1445 for metals.

Sampler Signature: **Antonio Luna** Date: **2/16/2011**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU02	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/16/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU03	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

WEATHER: Clear, 85°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 1135 END : 1225 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2002546.65 E: 242758.18	Radial	0 - 2"	121	PEAT (OL), reddish brown, dry, few fine sand and fine angular limestone gravel	Heavily vegetated, thick palm brush, Christmas bush Collect sample VEECA-6SMI03-0211 at 1225 for metals.

Sampler Signature: **Antonio Luna** Date: **02/16/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU03	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/16/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/16/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU04	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

WEATHER: Clear, 86°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 1100 END : 1140 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2003566.21 E: 243646.22	Radial	0 - 2"	200	PEAT (OL), reddish brown, few fine sand	Heavy and high vegetation, rock outcrops Collect sample VEECA-6SMI04-0211 at 1140 for metals. Collect sample VEECA-6SMI04-0211MS and VEECA-6SMI04-0211SD at 1140 for metals.

Sampler Signature: **Antonio Luna** Date: **02/18/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU04	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU05	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

WEATHER: Clear, 86°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : Stainless steel spoons

WATER LEVEL: Not encountered START : 1420 END : 1500 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2003554.16 E: 243966.74	Radial	0 - 2"	190	PEAT (OL), reddish brown, dry, loose, few fine sand	Heavy and high vegetation, rock outcrops Collect sample VEECA-6SMI05-0211 at 1500 for metals.

Sampler Signature: **Antonio Luna** Date: **02/18/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU05	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU06	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

WEATHER: Clear, 86°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampler and stainless steel spoons

WATER LEVEL: Not encountered START : 1200 END : 1240 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2004018.37 E: 244298.30	Radial	0 - 2"	209	PEAT (OL), reddish brown to brown, dry, loose, few fine sand	Rock outcrops, heavy vegetation Collect sample VEECA-6SMI06-0211 at 1240 for metals.

Sampler Signature: **Antonio Luna** Date: **02/18/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU06	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU07	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/17/11

WEATHER: Clear, 85°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampler

WATER LEVEL: Not encountered START : 0755 END : 0900 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2002895.27 E: 243139.62	Radial	0 - 2"	100	PEAT (OL), reddish brown, dry, loose, few fine to medium sand	Heavy and high vegetation, rock outcrops Collect sample VEECA-6SMI07-0211 at 0900 for metals.

Sampler Signature: **Antonio Luna** Date: **02/17/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU07	SHEET 2 OF 2

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/17/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/17/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU08	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/17/11

WEATHER: Clear, 85°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST Sampler

WATER LEVEL: Not encountered START : 1150 END : 1320 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2004149.44 E: 244613.34	Radial	0 - 2"	255	PEAT (OL), reddish brown, dry, loose, few fine sand	High and dense vegetation, rock outcrops Collect sample VEECA-6SMI08-0211 at 1320 for metals.

Sampler Signature: **Antonio Luna** Date: **02/17/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU08	SHEET 2 OF 2

CH2MHILL

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/17/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/17/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU09	SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

WEATHER: Clear, 86°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST Sampler

WATER LEVEL: Not encountered START : 0945 END : 1020 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS: NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2003107.09 E: 242673.96	Radial	0 - 2"	175	PEAT (OL), reddish brown, dry, loose, few fine to coarse sand with fine to coarse angular gravel	Dense and high vegetation, rock outcrops Collect sample VEECA-6SMI09-0211 at 1020 for metals.

Sampler Signature: **Antonio Luna** Date: **02/18/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU09	SHEET 2 OF 2

CH2MHILL

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

CH2MHILL	PROJECT NUMBER 392485.FI.FK	STATION ID VEECA-6DU10 SHEET 1 OF 2

INCREMENTAL SAMPLE LOG

PROJECT: NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

WEATHER: Clear, 86°F, calm SAMPLER : A. Luna, K. Butler, D. Whitaker, C. Vera

SAMPLING METHOD AND EQUIPMENT USED : MIST sampler

WATER LEVEL: Not encountered START : 1355 END : 1445 LOGGER : A. Luna

LOCATION OF SAMPLES (30m area) UTM COORDINATES	DIRECTION OF TRAVEL (N-S) (NE-SW)	INTERVAL (FT)	TOTAL NUMBER OF SAMPLES TAKEN PER QUADRANT	COMPOSITE DESCRIPTION SOIL NAME (USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSTENCY, SEDIMENTARY STRUCTURE, DEPOSITIONAL ENVIRONMENT,	COMMENTS NOTES: Vegetation coverage, rock coverage, material found, sample collection
N: 2004378.85 E: 243736.12	Radial	0 - 2"	138	PEAT (OL), reddish brown to brown, few fine sand	Dense and high vegetation, rock outcrops Collect sample VEECA-6SMI10-0211 at 1445 for metals.

Sampler Signature: **Antonio Luna** Date: **02/18/11**

PROJECT NUMBER	STATION ID	
392485.FI.FK	VEECA-6DU10	SHEET 2 OF 2

CH2MHILL

INCREMENTAL SAMPLE LOG

PROJECT : NAVFAC CLEAN 1000 - CTO 0037 - RI ECA LOCATION: Background Decision Unit 6 DATE: 02/18/11

NOTES

SOP(s) used (refer to SOP Log)? A-7

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

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

Sampler Signature: **Antonio Luna** Date: **02/18/11**

Appendix C
General Chemistry Data

Vieques-East
CTO-37, ECA
Sediment Raw Analytical Results
Grain Size Analysis
February 2011

Station ID	VEECA-5SD01	VEECA-5SD02		VEECA-5SD03	VEECA-5SD04	VEECA-5SD05	VEECA-5SD06	VEECA-5SD07	VEECA-5SD08
Sample ID	VEECA-5SD01-000H-0211	VEECA-5SD02-000H-0211	VEECA-5SD02P-000H-0211	VEECA-5SD03-000H-0211	VEECA-5SD04-000H-0211	VEECA-5SD05-000H-0211	VEECA-5SD06-000H-0211	VEECA-5SD07-000H-0211	VEECA-5SD08-000H-0211
Sample Date	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name									
Grain Size (PCT)									
Gravel (%)	0	0	NA	0	0	0	0	0	0
Sand (%)	10.9	25.5	NA	12.4	45.8	11.6	19.6	11.2	16.3
Coarse Sand (%)	0	0	NA	0	0	0	0	0	0
Medium Sand (%)	2.9	6.6	NA	2.7	17.4	2.5	6	2.7	3.1
Fine Sand (%)	8	18.9	NA	9.7	28.4	9.1	13.6	8.5	13.2
Fines (%)	89.1	74.5	NA	87.6	54.2	88.4	80.4	88.8	83.7
Grain Size (PCT Passing)									
GS08 Sieve 0.75" (19.0 mm)	100	100	NA	100	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	100	100	NA	100	100	100	100	100	100
Sieve No. 004 (4.75 mm)	100	100	NA	100	100	100	100	100	100
Sieve No. 010 (2.00 mm)	100	100	NA	100	100	100	100	100	100
Sieve No. 020 (850 um)	99.9	99.1	NA	98.9	97.3	99	97.2	98.7	98.3
Sieve No. 040 (425 um)	97.1	93.4	NA	97.3	82.6	97.5	94	97.3	96.9
Sieve No. 060 (250 um)	93.8	85.5	NA	94.4	68.4	95.4	90.5	95.4	94.7
Sieve No. 140 (106 um)	90.2	77.3	NA	89.8	57.1	91	83.8	91.3	88.4
Sieve No. 200 (75 um)	89.4	75.4	NA	88.3	55.1	89.3	81.4	89.6	85.1
Sieve No. 230 (63-UM)	89.1	74.5	NA	87.6	54.2	88.4	80.4	88.8	83.7

Notes:
NA - Not analyzed
PCT - Percent

Vieques-East
CTO-37, ECA
Sediment Raw Analytical Results
Grain Size Analysis
February 2011

Station ID	VEECA-5SD09	VEECA-5SD10	VEECA-5SD11		VEECA-5SD12	VEECA-5SD13	VEECA-5SD14	VEECA-5SD15
Sample ID	VEECA-5SD09-000H-0211	VEECA-5SD10-000H-0211	VEECA-5SD11-000H-0211	VEECA-5SD11P-000H-0211	VEECA-5SD12-000H-0211	VEECA-5SD13-000H-0211	VEECA-5SD14-000H-0211	VEECA-5SD15-000H-0211
Sample Date	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name								
Grain Size (PCT)								
Gravel (%)	0	0	0	NA	0	0	0	38.4
Sand (%)	8.5	14	40.5	NA	50.8	56.2	26.8	45.5
Coarse Sand (%)	0	0	0	NA	6	0	0	5.5
Medium Sand (%)	2	4.6	14.3	NA	12.7	25.2	7.9	10.3
Fine Sand (%)	6.5	9.4	26.2	NA	32.1	31	18.9	29.7
Fines (%)	91.5	86	59.5	NA	49.2	43.8	73.2	16.1
Grain Size (PCT Passing)								
GS08 Sieve 0.75" (19.0 mm)	100	100	100	NA	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	100	100	100	NA	100	100	100	74
Sieve No. 004 (4.75 mm)	100	100	100	NA	100	100	100	61.6
Sieve No. 010 (2.00 mm)	100	100	100	NA	94	100	100	56.1
Sieve No. 020 (850 um)	98.9	96.9	91.6	NA	87.7	82.9	94.9	51.3
Sieve No. 040 (425 um)	98	95.4	85.7	NA	81.3	74.8	92.1	45.8
Sieve No. 060 (250 um)	96.8	93.7	80.4	NA	74.6	67.5	89.1	39.8
Sieve No. 140 (106 um)	93.9	89	68.4	NA	57.6	52.4	80	25.7
Sieve No. 200 (75 um)	92.4	86.9	62.5	NA	51.5	46.4	75.1	19.3
Sieve No. 230 (63-UM)	91.5	86	59.5	NA	49.2	43.8	73.2	16.1

Notes:
NA - Not analyzed
PCT - Percent

Vieques
ECA
Surface Soil Raw Analytical Results
June 2011

Sample Related Area	1DU1	1DU2	2DU2	2DU4	4DU06	4DU12	4DU15
Station ID	VEECA-1SS01	VEECA-1SS02	VEECA-2SS01	VEECA-2SS02	VEECA-4SS02	VEECA-4SS03	VEECA-4SS04
Sample ID	VEECA-1SS01-0001-0611	VEECA-1SS02-0001-0611	VEECA-2SS01-0001-0611	VEECA-2SS02-0001-0611	VEECA-4SS02-0001-0611	VEECA-4SS03-0001-0611	VEECA-4SS04-0001-0611
Sample Date	6/3/11 9:35	6/3/11 10:05	6/3/11 9:50	6/3/11 8:30	6/3/11 8:45	6/3/11 9:15	6/3/11 8:05
Chemical Name							
Wet Chemistry							
% Solids (PCT)	93	96	96	74	77	72	75
Total organic carbon (TOC) (UG/G)	54,000	29,000	73,000	52,000	74,000	180,000	140,000

\\tampa\Proj\USNAVFACENGCOM\408040CTO037\ECA_RI_REPORT_2011\Appendix C General Chemistry Data\[TOC_PercentSolids_Only_mjz.xlsx]; Hillary Ott, 07/26/2011

Notes:
NS - Not sampled
PCT - Percent
UG/G - Micrograms per gram

Appendix D
Survey Data

Appendix D - Survey Data

ECA				
Station ID	Sample ID	Matrix	(UTM NAD 83 Zone 20Q)	
			Northing	Easting
Beach Decision Unit (1)				
VEECA-1DU01	VEECA-1SMI01-0211	SMI	2006793.59391	258986.56304
	VEECA-1SMI01T-0211	SMI (Tripl)	2006793.59391	258986.56304
	VEECA-1SMI01TT-0211		2006793.59391	258986.56304
VEECA-1DU02	VEECA-1SMI02-0211	SMI	2006611.75892	259168.64162
VEECA-1SB01	VEECA-1SB01-1H02-0211	SB	2006815.82431	258975.89023
	VEECA-1SB01-1H02-0211-MS	SB (MS)	2006815.82431	258975.89023
	VEECA-1SB01-1H02-0211-SD	SB (MSD)	2006815.82431	258975.89023
VEECA-1SB02	VEECA-1SB02-1H02-0211	SB	2006723.52426	259054.72505
	VEECA-1SB02P-1H02-0211	SB (FD)	2006723.52426	259054.72505
Lowland Decision Unit (2)				
VEECA-2DU01	VEECA-2SMI01-0211	SMI	2006917.09046	258834.48075
VEECA-2DU02	VEECA-2SMI02-0211	SMI	2006665.67951	259043.18659
VEECA-2DU03	VEECA-2SMI03-0211	SMI	2006645.55291	258830.12422
VEECA-2DU04	VEECA-2SMI04-0211	SMI	2006550.00050	259105.00190
VEECA-2DU05	VEECA-2SMI05-0211	SMI	2006505.00050	259195.00190
VEECA-2SB01	VEECA-2SB01-0103-0211	SB	2006914.66000	258900.91000
VEECA-2SB02	VEECA-2SB02-0103-0211	SB	2006927.89860	258826.41520
	VEECA-2SB02P-0103-0211	SB (FD)	2006927.89860	258826.41520
VEECA-2SB03	VEECA-2SB03-0001-0211	SS	2006901.59000	258842.07000
VEECA-2SB04	VEECA-2SB04-0507-0211	SB	2006679.53610	259033.48970
VEECA-2SB05	VEECA-2SB05-0507-0211	SB	2006643.80000	259051.20000
VEECA-2SB06	VEECA-2SB06-0507-0211	SB	2006667.38000	259029.87000
	VEECA-2SB06-0507-0211-MS	SB (MS)	2006667.38000	259029.87000
	VEECA-2SB06-0507-0211-SD	SB (MSD)	2006667.38000	259029.87000
VEECA-2SB07	VEECA-2SB07-0H2H-0211	SB	2006649.08000	258842.39000
VEECA-2SB08	VEECA-2SB08-0204-0211	SB	2006629.94000	258841.98000
VEECA-2SB09	VEECA-2SB09-4H6H-0211	SB	2006622.46000	258816.76000
	VEECA-2SB09P-4H6H-0211	SB (FD)	2006622.46000	258816.76000
VEECA-2SB10	VEECA-2SB10-0204-0211	SB	2006573.02000	259105.76000
VEECA-2SB11	VEECA-2SB11-7H9H-0211	SB	2006571.85000	259135.65000
VEECA-2SB12	VEECA-2SB12-0H2H-0211	SB	2006563.86000	259078.94000
VEECA-2SB13	VEECA-2SB13-000H-0211	SS	2006531.74000	259218.74000
VEECA-2SB14	VEECA-2SB14-1H3H-0211	SB	2006504.85670	259214.52120
VEECA-2SB15	VEECA-2SB15-0406-0211	SB	2006491.44000	259206.76000
Lagoon Fringe Decision Unit (3)				
VEECA-3DU01	VEECA-3SMI01-0211	SMI	2006898.16307	258857.77267
VEECA-3DU02	VEECA-3SMI02-0211	SMI	2006695.80023	258835.59539
	VEECA-3SMI02-0211-MS	SMI (MS)	2006695.80023	258835.59539
	VEECA-3SMI02-0211-SD	SMI (MSD)	2006695.80023	258835.59539
VEECA-3DU03	VEECA-3SMI03-0211	SMI	2006598.23976	258952.00260
VEECA-3DU04	VEECA-3SMI04-0211	SMI	2006636.48564	259034.36528
	VEECA-3SMI04T-0211	SMI (Tripl)	2006636.48564	259034.36528
	VEECA-3SMI04TT-0211		2006636.48564	259034.36528
VEECA-3DU05	VEECA-3SMI05-0211	SMI	2006750.48990	258945.75738
VEECA-3SB01	VEECA-3SB01-0001-0211	SS	2006901.73000	258872.69000

Appendix D - Survey Data

ECA				
Station ID	Sample ID	Matrix	(UTM NAD 83 Zone 20Q)	
			Northing	Easting
VEECA-3SB02	VEECA-3SB02-0001-0211	SS	2006704.59247	258834.20159
	VEECA-3SB02P-0001-0211	SS (FD)	2006704.59247	258834.20159
VEECA-3SB03	VEECA-3SB03-0002-0211	SS	2006581.60921	258988.72444
VEECA-3SB04	VEECA-3SB04-001H-0211	SS	2006645.32343	259022.38079
	VEECA-3SB04-001H-0211-MS	SS (MS)	2006645.32343	259022.38079
	VEECA-3SB04-001H-0211-SD	SS (MSD)	2006645.32343	259022.38079
VEECA-3SB05	VEECA-3SB05-0002-0211	SS	2006785.86000	258933.33000
Upland Decision Unit (4)				
VEECA-4DU01	VEECA-4SMI01-0211	SMI	2007030.00050	258868.54115
VEECA-4DU02	VEECA-4SMI02-0211	SMI	2007030.00050	259000.00180
	VEECA-4SMI02T-0211	SMI (Tripl)	2007030.00050	259000.00180
	VEECA-4SMI02TT-0211		2007030.00050	259000.00180
VEECA-4DU03	VEECA-4SMI03-0211	SMI	2006532.82223	258817.30249
VEECA-4DU04	VEECA-4SMI04-0211	SMI	2006361.74878	258834.17319
	VEECA-4SMI04-0211-MS	SMI (MS)	2006361.74878	258834.17319
	VEECA-4SMI04-0211-SD	SMI (MSD)	2006361.74878	258834.17319
VEECA-4DU05	VEECA-4SMI05-0211	SMI	2006544.28153	258925.00180
VEECA-4DU06	VEECA-4SMI06-0211	SMI	2006415.00050	258925.00180
VEECA-4DU07	VEECA-4SMI07-0211	SMI	2006475.00050	259060.00185
VEECA-4DU08	VEECA-4SMI08-0211	SMI	2006400.00050	259105.00190
VEECA-4DU09	VEECA-4SMI09-0211	SMI	2006385.00050	259195.00190
	VEECA-4SMI09T-0211	SMI (Tripl)	2006385.00050	259195.00190
	VEECA-4SMI09TT-0211		2006385.00050	259195.00190
VEECA-4DU10	VEECA-4SMI10-0211	SMI	2006292.14741	259250.12432
VEECA-4DU11	VEECA-4SMI11-0211	SMI	2006475.00050	259300.00190
	VEECA-4SMI11T-0211	SMI (Tripl)	2006475.00050	259300.00190
	VEECA-4SMI11TT-0211		2006475.00050	259300.00190
VEECA-4DU12	VEECA-4SMI12-0211	SMI	2006400.00050	259465.00190
VEECA-4DU13	VEECA-4SMI13-0211	SMI	2006535.00050	259525.00190
VEECA-4DU14	VEECA-4SMI14-0211	SMI	2006520.00050	259735.00190
VEECA-4DU15	VEECA-4SMI15-0211	SMI	2006595.00050	259930.00190
VEECA-4SS01	VEECA-4SS01-0001-0211	SS	2006586.40000	259842.98000
	VEECA-4SS01-0001-0211-MS	SS (MS)	2006586.40000	259842.98000
	VEECA-4SS01-0001-0211-SD	SS (MSD)	2006586.40000	259842.98000
	VEECA-4SS01P-0001-0211	SS (FD)	2006586.40000	259842.98000
VEECA-4SB01	VEECA-4SB01-001H-0211	SS	2006326.84000	258836.55000
Lagoon Decision Unit (5)				
VEECA-5SD01	VEECA-5SD01-000H-0211	SD	2006825.68564	258866.19734
VEECA-5SD02	VEECA-5SD02-000H-0211	SD	2006822.22866	258893.34575
	VEECA-5SD02P-000H-0211	SD (FD)	2006822.22866	258893.34575
VEECA-5SD03	VEECA-5SD03-000H-0211	SD	2006761.39289	258910.84508
VEECA-5SD04	VEECA-5SD04-000H-0211	SD	2006706.02968	258947.15858
VEECA-5SD05	VEECA-5SD05-000H-0211	SD	2006646.49936	258983.47208
VEECA-5SD06	VEECA-5SD06-000H-0211	SD	2006619.11541	259004.90299
VEECA-5SD07	VEECA-5SD07-000H-0211	SD	2006592.32676	259040.62119
VEECA-5SD08	VEECA-5SD08-000H-0211	SD	2006648.88057	258952.51631
VEECA-5SD09	VEECA-5SD09-000H-0211	SD	2006716.14984	258897.15310

Appendix D - Survey Data

ECA				
Station ID	Sample ID	Matrix	(UTM NAD 83 Zone 20Q)	
			Northing	Easting
VEECA-5SD10	VEECA-5SD10-000H-0211	SD	2006769.13183	258869.17385
VEECA-5SD11	VEECA-5SD11-000H-0211	SD	2006794.72987	258838.21808
	VEECA-5SD11P-000H-0211	SD (FD)	2006794.72987	258838.21808
VEECA-5SD12	VEECA-5SD12-000H-0211	SD	2006738.77136	258840.00399
VEECA-5SD13	VEECA-5SD13-000H-0211	SD	2006682.81286	258867.98325
VEECA-5SD14	VEECA-5SD14-000H-0211	SD	2006645.90405	258904.29674
VEECA-5SD15	VEECA-5SD15-000H-0211	SD	2006622.68723	258948.94449
VEECA-5SW01	VEECA-5SW01-0211	SW	2006822.22866	258893.34575
VEECA-5SW02	VEECA-5SW02-0211	SW	2006769.13183	258869.17385
	VEECA-5SW02P-0211	SW (FD)	2006769.13183	258869.17385
VEECA-5SW03	VEECA-5SW03-0211	SW	2006716.14984	258897.15310
VEECA-5SW04	VEECA-5SW04-0211	SW	2006648.88057	258952.51631
	VEECA-5SW04-0211-MS	SW (MS)	2006648.88057	258952.51631
	VEECA-5SW04-0211-SD	SW (MSD)	2006648.88057	258952.51631
VEECA-5SW05	VEECA-5SW05-0211	SW	2006592.32676	259040.62119
Incremental Background				
VEECA-6DU01	VEECA-6SMI01-0211	SMI	2003095.48474	242930.39608
VEECA-6DU02	VEECA-6SMI02-0211	SMI	2002867.78342	242784.88498
	VEECA-6SMI02T-0211	SMI (Tripl)	2002867.78342	242784.88498
	VEECA-6SMI02TT-0211		2002867.78342	242784.88498
VEECA-6DU03	VEECA-6SMI03-0211	SMI	2002546.65540	242758.18551
VEECA-6DU04	VEECA-6SMI04-0211	SMI	2003566.21364	243646.22208
	VEECA-6SMI04-0211-MS	SMI (MS)	2003566.21364	243646.22208
	VEECA-6SMI04-0211-SD	SMI (MSD)	2003566.21364	243646.22208
VEECA-6DU05	VEECA-6SMI05-0211	SMI	2003554.16170	243966.74555
VEECA-6DU06	VEECA-6SMI06-0211	SMI	2004018.37665	244298.30825
VEECA-6DU07	VEECA-6SMI07-0211	SMI	2002895.27952	243139.62932
VEECA-6DU08	VEECA-6SMI08-0211	SMI	2004149.44387	244613.34793
VEECA-6DU09	VEECA-6SMI09-0211	SMI	2003107.09964	242673.96019
VEECA-6DU10	VEECA-6SMI10-0211	SMI	2004378.85196	243736.12129

Appendix E
Data Validation Reports

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B040475, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B040475. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-EB01-020311-SMI	G1B040475-001	water	X	X	X	X	X
VEECA-4SMI02-0211	G1B040475-002	soil	X	X	X	X	X
VEECA-4SMI02T-0211	G1B040475-003	soil	X	X	X	X	X
VEECA-4SMI01-0211	G1B040475-004	soil	X	X	X	X	X
VEECA-4SMI02TT-0211	G1B040475-005	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: sample VEECA-EB01-020311-SMI–equipment blank; and samples VEECA-4SMI02T-0211and VEECA-4SMI02TT-0211-field triplicate of sample VEECA-4SMI02-0211.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- HPLC Performance *
- ICP MS Tuning *
- Initial/Continuing Calibrations

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

- ICSA/ICSAB Standards *
- LLQ Standards *
- Blanks
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Certified Reference Material
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions *
- Field Duplicates NA
- Field Triplicates *
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

The Certified Reference Material (CRM) exhibited low recoveries for two compounds that resulted in qualifying the non-detected results as rejected in all samples.

Perchlorate

Due to grinding and/pr QC blank contamination, qualifications were added to the data.

Metals

One of the associated ICV standards exhibited a high recovery for sodium. The reported positive results for sodium in the field samples were qualified as estimated J.

The associated grinding blank exhibited contamination that resulted in qualifications to the sample results.

The MS/MSD pair associated with the field samples in this SDG exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required. This MS/MSD pair was reported in SDG G1B050467.

Please note that selenium was flagged with a B flag on some Form 1 equivalents. This flag should have been a J. The flag was corrected by the validator.

Hexavalent Chromium

The associated grinding blank exhibited contamination that resulted in qualifications to the sample results.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/2-3/11 and samples were received at the laboratory on 2/4/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibrations

Metals

The associated ICV analyzed 2/25/11 at 1520 exhibited a recovery for sodium that was above the upper QC limit of 110% at 116.4%. Therefore the reported positive results for sodium were qualified as estimated J in the soil samples, with a qualifier code of CCH.

Blanks

Perchlorate

The associated method, grinding and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Compound	Concentration	LOD/LOQ
Grinding Blank: G1B230000-373 extraction 2/23/10	perchlorate	0.36J ug/kg	0.4/5.0 ug/kg
WECCA-EB01-020311-SMI	perchlorate	0.59 ug/L	0.25/5.0 ug/L

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

Sample ID	Compound	Q Flag	Qual Code
VEECA-4SMI02-0211, VEECA-4SMI02T-0211, VEECA-4SMI01-0211, VEECA-4SMI02TT-0211	perchlorate	report at value with U	EBL

Blanks

Metals

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B040475006	copper sodium	11.4J ug/L/ 0.57 mg/Kg 331J ug/L/16.55 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg

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

Sample ID	Analyte	Q Flag	Q Code
all soil samples	copper sodium	J	GBL

Hexavalent Chromium

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B040475006	hexavalent chromium	2.1J ug/L/0.0105 mg/Kg	LOD

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

Sample ID	Analyte	Q Flag	Q Code
VEECA-4SMI01-0211	hexavalent chromium	U at LOD	GBL

Certified Reference Material

Explosives

The CRM associated with all samples exhibited low recoveries for 3-nitrotoluene at 64% (QC limit 69-124%) and nitrobenzene at 56% (58-119%); therefore all positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R), qualifier code: CRML.

Matrix Spike Recoveries

Metals

The matrix spike pair associated with samples in this SDG exhibited non-compliant %R's for one analyte that resulted in the qualification of sample results. A summary of this non-compliance and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SMI15-0211	antimony	all soil samples	37/33	J/UJ	MSL

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
all samples	3-nitrotoluene nitrobenzene	+/-	J/R	CRML

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
VEECA-4SMI02-0211, VEECA-4SMI02T-0211, VEECA-4SMI01-0211, VEECA-4SMI02TT-0211	perchlorate	+	report at value with U	EBL

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	sodium	+	J	CCH
all soil samples	copper sodium*	+J	J	GBL
all soil samples	antimony	+/-	J/UJ	MSL

Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
VEECA-4SMI01-0211	hexavalent chromium	+J	U at LOD	GBL

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B040475

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020311-SMI

HPLC

Lot-Sample #...: G1B040475-001 Work Order #...: MD2771A6 Matrix.....: WATER
Date Sampled...: 02/03/11 10:00 Date Received..: 02/04/11
Prep Date.....: 02/08/11 Analysis Date..: 02/19/11
Prep Batch #...: 1039362 Analysis Time..: 20:54
Dilution Factor: 1.04

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
1,3,5-Trinitrobenzene	0.052 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.052 U	0.16	ug/L	0.052
2,4,6-Trinitrotoluene	0.052 U	0.16	ug/L	0.052
2,4-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2,6-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.092
3-Nitrotoluene	0.10 ~~U~~ R,CRML	0.52	ug/L	0.059
4-Amino-2,6-dinitrotoluene	0.052 U	0.16	ug/L	0.052
4-Nitrotoluene	0.10 U	1.0	ug/L	0.092
HMX	0.052 U	0.16	ug/L	0.037
Nitrobenzene	0.052 ~~U~~ R,CRML	0.16	ug/L	0.052
Nitroglycerin	0.52 U	1.0	ug/L	0.34
PETN	0.52 U	1.0	ug/L	0.31
RDX	0.052 U	0.26	ug/L	0.037
Tetryl	0.052 U	0.16	ug/L	0.052
3,5-Dinitroaniline	0.052 U	0.52	ug/L	0.026

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(84 - 125)

VM 05/11/11

010

CH2M Hill Inc

Client Sample ID: VRECA-4SMI02-0211

HPLC

Lot-Sample #...: G1B040475-002 Work Order #...: MD3CL1CA Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 09:38
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R,CRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R,CRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 051111

CH2M Hill Inc

Client Sample ID: VKECA-4SMI02T-0211

HPLC

Lot-Sample #...: G1B040475-003 Work Order #...: MD3CW1CA Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 10:23
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R,CRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R,CRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(81 - 127)

WM 051111

CH2M Hill Inc

Client Sample ID: VEECA-4SMI01-0211

HPLC

Lot-Sample #...: G1B040475-004 Work Order #...: MD3CX1CA Matrix.....: SOLID
Date Sampled...: 02/02/11 12:15 Date Received..: 02/04/11
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 11:08
Dilution Factor: 0.92

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	230	ug/kg	8.1
1,3,5-Trinitrobenzene	28 U	230	ug/kg	9.2
1,3-Dinitrobenzene	28 U	230	ug/kg	3.9
2,4,6-Trinitrotoluene	28 U	230	ug/kg	18
2,4-Dinitrotoluene	28 U	230	ug/kg	4.9
2,6-Dinitrotoluene	28 U	230	ug/kg	6.7
2-Amino-4,6-dinitrotoluene	28 U	230	ug/kg	12
2-Nitrotoluene	28 U	230	ug/kg	12
3-Nitrotoluene	28 U R, CRML	230	ug/kg	14
4-Amino-2,6-dinitrotoluene	28 U	230	ug/kg	9.2
4-Nitrotoluene	28 U	230	ug/kg	17
HMX	28 U	230	ug/kg	11
Nitrobenzene	28 U R, CRML	230	ug/kg	16
Nitroglycerin	55 U	460	ug/kg	14
PETN	55 U	460	ug/kg	23
RDX	28 U	230	ug/kg	11
Tetryl	28 U	230	ug/kg	9.2

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(81 - 127)

VM 05/11/11

013

CH2M Hill Inc

Client Sample ID: VEECA-4SMI02TT-0211

HPLC

Lot-Sample #...: G1B040475-005 Work Order #...: MD3C11CA Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 15:39
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.6
1,3-Dinitrobenzene	29 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.0
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	12
3-Nitrotoluene	29 ~~U~~ R1CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.6
4-Nitrotoluene	29 U	240	ug/kg	17
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R1CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	14
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.6

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MT 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020311-SMI

Dissolved HPLC

Lot-Sample #...:	G1B040475-001	**Work Order #...:**	MD2772A5	**Matrix.....:**	WATER
Date Sampled...:	02/03/11 10:00	**Date Received..:**	02/04/11		
Prep Date.....:	02/22/11	**Analysis Date..:**	02/22/11		
Prep Batch #...:	1053108	**Analysis Time..:**	20:57		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.59	0.50	ug/L	0.082

MM 042111

CH2M Hill Inc

Client Sample ID: VERCA-4SMI02-0211

HPLC

Lot-Sample #...: G1B040475-002 Work Order #...: MD3CL1A3 Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 03:43
Dilution Factor: 0.97

Method.....: SW846 6850_DOD Ha

0.38U, EBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.38 J,B~~	4.8	ug/kg	0.25

4.8 U, EBL MM 051211

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 042111

CH2M Hill Inc

Client Sample ID: VERCA-4SMI02T-0211

HPLC

Lot-Sample #...:	G1B040475-003	Work Order #...:	MD3CW1A3	Matrix.....:	SOLID
Date Sampled...:	02/02/11 11:00	Date Received..:	02/04/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/25/11		
Prep Batch #...:	1054373	Analysis Time..:	04:01		
Dilution Factor:	0.98				
		Method.....:	SW846 6850_DOD Ha		

0.43U, EBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.43 J,B~~	4.9	ug/kg	0.25

~~4.9 U, EBL~~ MM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 04/21/11

CH2M Hill Inc

Client Sample ID: VKECA-4SMI01-0211

HPLC

Lot-Sample #...: G1B040475-004 Work Order #...: MD3CX1A3 Matrix.....: SOLID
Date Sampled...: 02/02/11 12:15 Date Received..: 02/04/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 04:19
Dilution Factor: 0.98

Method.....: SW846 6850_DOD Ha

0.67U, EBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.67 J,B~~	4.9	ug/kg	0.25

4.9U, EBL UM05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

UM 04/21/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI02TT-0211

HPLC

Lot-Sample #...: G1B040475-005 Work Order #...: MD3C11A3 Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 04:36
Dilution Factor: 0.95
Method.....: SW846 6850_DOD Ha

0.38U, EBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.38 J,B~~	4.8	ug/kg	0.25

4.8U, EBL MM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 04/2/11

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI02-0211
Lot Number:	G1B040475	**Lab WorkOrder:**	MD3CL
Matrix:	SOIL	**Lab Sample ID:**	G1B040475002
% Solids:	100.0	**Date/Time Collected:**	02/02/11 11:00
Units:	MG/KG	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16200.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	33.9000			P
7440-39-3	Barium	20.5000			P
7440-41-7	Beryllium	0.1900	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	119000.00			P
7440-47-3	Chromium	39.9000			P
7440-48-4	Cobalt	4.5000			P
7440-50-8	Copper	22.2000		J GBL	P
7439-89-6	Iron	21700.000			P
7439-92-1	Lead	2.1000	J		P
7439-95-4	Magnesium	15800.000			P
7439-96-5	Manganese	552.0000			P
7440-02-0	Nickel	11.7000			P
7440-09-7	Potassium	2920.0000			P
7782-49-2	Selenium	0.7100	J ~~U~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	718.0000		J ~~GBL~~ CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	51.1000			P
7440-66-6	Zinc	32.6000			P

JAC 5/11

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.
Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI02T-0211
Lot Number:	G1B040475	**Lab WorkOrder:**	MD3CW
Matrix:	SOIL	**Lab Sample ID:**	G1B040475003
% Solids:	100.0	**Date/Time Collected:**	02/02/11 11:00
Units:	MG/KG	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16000.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	35.0000			P
7440-39-3	Barium	20.6000			P
7440-41-7	Beryllium	0.1800	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	129000.00			P
7440-47-3	Chromium	38.7000			P
7440-48-4	Cobalt	4.3000			P
7440-50-8	Copper	20.1000		J GBL	P
7439-89-6	Iron	20600.000			P
7439-92-1	Lead	1.7000	J		P
7439-95-4	Magnesium	15600.000			P
7439-96-5	Manganese	538.0000			P
7440-02-0	Nickel	11.3000			P
7440-09-7	Potassium	2760.0000			P
7782-49-2	Selenium	0.7100	J ~~B~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	756.0000		CCH J ~~GBC~~	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	49.3000			P
7440-66-6	Zinc	32.1000			P

JAC 5/10

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI02TT-0211
Lot Number:	G1B040475	**Lab WorkOrder:**	MD3C1
Matrix:	SOIL	**Lab Sample ID:**	G1B040475005
% Solids:	100.0	**Date/Time Collected:**	02/02/11 11:00
Units:	MG/KG	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16200.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	36.1000			P
7440-39-3	Barium	21.0000			P
7440-41-7	Beryllium	0.2000	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	121000.00			P
7440-47-3	Chromium	39.9000			P
7440-48-4	Cobalt	4.5000			P
7440-50-8	Copper	21.3000		J GBL	P
7439-89-6	Iron	21400.000			P
7439-92-1	Lead	2.2000	J		P
7439-95-4	Magnesium	16500.000			P
7439-96-5	Manganese	561.0000			P
7440-02-0	Nickel	11.5000			P
7440-09-7	Potassium	2860.0000			P
7782-49-2	Selenium	0.5700	J ~~B~~		P
7440-22-4	Silver	1.0000	U	J CCH	P
7440-23-5	Sodium	814.0000		~~J GBL~~	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	51.3000			P
7440-66-6	Zinc	32.0000			P

JAC 5/11

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI01-0211
Lot Number:	G1B040475	**Lab WorkOrder:**	MD3CX
Matrix:	SOIL	**Lab Sample ID:**	G1B040475004
% Solids:	100.0	**Date/Time Collected:**	02/02/11 12:15
Units:	MG/KG	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	19000.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	17.1000			P
7440-39-3	Barium	33.7000			P
7440-41-7	Beryllium	0.3700	J		P
7440-43-9	Cadmium	0.2600	J		P
7440-70-2	Calcium	70000.000			P
7440-47-3	Chromium	32.1000			P
7440-48-4	Cobalt	5.0000			P
7440-50-8	Copper	19.3000		J GBL	P
7439-89-6	Iron	20800.000			P
7439-92-1	Lead	5.0000			P
7439-95-4	Magnesium	7000.0000			P
7439-96-5	Manganese	473.0000			P
7440-02-0	Nickel	11.0000			P
7440-09-7	Potassium	4730.0000			P
7782-49-2	Selenium	0.9100	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	537.0000		CCH J ~~GBC~~	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	33.6000			P
7440-66-6	Zinc	35.0000			P

JAC 5/11/11

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

023

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-020311-SMI
Lot Number:	G1B040475	**Lab WorkOrder:**	MD277
Matrix:	WATER	**Lab Sample ID:**	G1B040475001
% Solids:	0.0	**Date/Time Collected:**	02/03/11 10:00
Units:	UG/L	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	50.3000	J		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	158.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	297.0000	J		P
7440-28-0	Thallium	1.7000			P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020311-SMI

General Chemistry

Lot-Sample #...: G1B040475-001 Work Order #...: MD277 Matrix.....: WATER
Date Sampled...: 02/03/11 10:00 Date Received..: 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.0050 U	0.010	mg/L	SW846 7196A	02/04/11	1035210

Dilution Factor: 1 Analysis Time..: 09:52 DL.....: 0.0020

JAC 4/26/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI01-0211

General Chemistry

Lot-Sample #...: G1B040475-004 Work Order #...: MD3CX Matrix.....: SOLID
Date Sampled...: 02/02/11 12:15 Date Received..: 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.6	0.10	--	SW846 9045C	02/24-02/25/11	1059238
		Dilution Factor: 1		Analysis Time..: 15:54	DL.....: 0.10	
Hexavalent Chromium	0.025 ~~0.011 J~~ U	GBL 0.050	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 1		Analysis Time..: 16:47	DL.....: 0.010	

NOTE(S):

RL Reporting Limit

J Estimated result. Result is less than RL.

JAC 4/26/11

026

CH2M Hill Inc

Client Sample ID: VEECA-4SMI02-0211

General Chemistry

Lot-Sample #...: G1B040475-002 Work Order #...: MD3CL Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.1	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:02	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 1		Analysis Time..: 16:46	DL.....: 0.010	

JAC 4/26/11

027

CH2M Hill Inc

Client Sample ID: VEECA-4SMI02T-0211

General Chemistry

Lot-Sample #...: G1B040475-003 Work Order #...: MD3CW Matrix.....: SOLID
Date Sampled...: 02/02/11 11:00 Date Received..: 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:46 DL.....: 0.010

JAC 4/26/11

028

CH2M Hill Inc

Client Sample ID: VEECA-4SMI02TT-0211

General Chemistry

Lot-Sample #...: G1B040475-005 **Work Order #...:** MD3C1 **Matrix.....:** SOLID
Date Sampled...: 02/02/11 11:00 **Date Received..:** 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:47 DL.....: 0.010

JAC 4/26/11

029

Case Narrative

TestAmerica West Sacramento Project Number G1B040475

General Comments

Please note that on February 4, 2011 the client requested the following client IDs changed: VEECA-4DU01-0211 changed to VEECA-4SMI01-0211, VEECA-4DU02-0211 changed to VEECA-4SMI02-0211, VEECA-4DU02T-0211 changed to VEECA-4SMI02T-0211 and VEECA-4DU02TT-0211 changed to VEECA-4SMI02TT-0211.

Also on February 7, 2011 the client cancelled the pH analysis for samples VEECA-4SMI02T-0211 and VEECA-4SMI02TT-0211.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Samples for analysis of all methods were processed by multi-incremental sampling techniques (MIS) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

The data for the laboratory duplicate and triplicate are reported as samples 7 and 8 for 8330B. The native sample is 4, client ID VEECA-4SMI01-0211. The data for the laboratory duplicate and triplicate for perchlorate via 6850 are reported as part of lot G1B050467. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of the summary section.

WATER, 8330B, Nitroaromatics & Nitramines
Sample: 1
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

SOLID, 8330B, Nitroaromatics & Nitramines
Samples: 2, 3, 4, 5
The certified reference material (CRM) associated with this extraction batch has recovery outside the established control limits for Nitrobenzene and 3-Nitrotoluene. This sample is reported as work order MEFE51AE. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control.

030

Case Narrative

TestAmerica West Sacramento Project Number G1B040475

The MS/MSD associated with this extraction batch has recoveries outside the established control limits for 2,6-Dinitrotoluene and Nitroglycerin. Acceptable LCS data demonstrate that the analytical system is in control. This anomaly is most likely matrix related.

Sample: 4
The noted sample required manual integration for 3,5-Dinitroaniline. Detailed information can be found in the Manual Integration Addendum section of this report.

WATER, 6850/DOD Handbook, Perchlorate
Sample: 1
In accordance with the requirements of method 6850, both a LCS and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

This sample was prepped and analyzed but due to a MS/MSD prep error, required a re-preparation and reanalysis. Upon reanalysis it was noted that the data differed. The perchlorate was not detected for the initial analysis but had a positive detection above the limit of quanitation (LOQ) for the reprep/reanalysis. Upon investigation it was noted that for the initial analysis, the poly bottle submitted for hexavalent chromium was used. For the second analysis, the correct poly bottle with 6850 indicated on the label was used. The data reported is from the reprep/reanalysis of the sample done using the sample from the sample bottle indicating 6850.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 2, 3, 4, 5
In accordance with the requirements of method 6850, both a laboratory control sample LCS and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MERHT1AC
SMCS: MERHT1AE

The grinding blank associated with these samples and reported under work order MERHT1AD had a positive detection for perchlorate at a level between the LOQ of 5.0 ug/Kg and the detection limit (DL) of 0.26 ug/Kg. This grinding blank is from the MIS process. The method blank is non-detect for perchlorate. Samples having positive detections for perchlorate are flagged with a B, denoting the target analyte is present at a reportable level in the associated grinding blank.

Case Narrative

TestAmerica West Sacramento Project Number G1B040475

Certified Reference Material (CRM) was not immediately available for the multi-incremental sampling (MIS) as requested for 6850 (perchlorate) analysis.
A 200 gram aliquot of Ottawa Sand was fortified with 10ug of Perchlorate (5.0 ug/Kg), mixed well, air dried and ground via puck mill. It was then sampled as per the MIS procedure. A 3 gram portion was extracted in a batch for method 6850. The results are as follows:

Description	Result (ug/Kg)	Comment
Method Blank	ND	RL 5.0 ug/Kg
LCS	4.7	94% Recovery (Limit 80-120%)
Puck Mill Blank	ND	RL 5.0 ug/Kg
Puck Mill LCS	4.2	83% Recovery (Limit 80-120%)

The Puck Mill Blank and Puck Mill LCS are the MIS processed samples and the results demonstrate the MIS process is in control. Please see supporting data in the Appendix section.

SOLID, 6010B/6020, Metals
Samples: 2, 3, 4, 5
The recoveries for Aluminum, Antimony, Calcium. Chromium, Iron, Potassium and Manganese are outside the established control limits for the MS/MSD associated with this batch. The concentration of Aluminum, Calcium. Chromium, Iron, and Manganese in the parent sample is greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

In addition, due to the increased sample size and inherent matrix, the samples were initially run at 10x and 1X. The instrument shut down when it encountered the first sample at 1X. After analyzing the 10x data, we determined to rerun all of the samples at 5x dilutions. All of the data was reported from the 5x dilutions run on February 25, 2011.

An aqueous grinding blank was created by rinsing the mortar and pestal before each use and compositing the rinsate. The data has been reported as sample -6 Calcium was detected at a reportable level. There were also detections between the LOQ and DL for Copper, Potassium, Magnesium, Manganese, Sodium, Thallium and Zinc.

Case Narrative

TestAmerica West Sacramento Project Number G1B040475

SOLID, 7196A, Hexavalent Chromium
Samples: 2, 3, 4, 5
An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -6. There was a detection of 2.1 ug/L, between the LOQ of 10 ug/L and DL of 2.0 ug/L for Hexavalent Chromium.

SOLID, 9045C, pH (9045C) - Non-Aqueous
Sample: 4
The noted sample was reanalyzed after the holding time had expired due to a malfunction with the pH probe. There was insufficient volume for re-extraction of the sample.

There were no other anomalies associated with this project.

033

Sample Summary

TestAmerica West Sacramento Project Number G1B040475

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MD277	1	VEECA-EB01-020311-SMI	2/3/2011 10:00 AM	2/4/2011 09:10 AM
MD3CL	2	VEECA-4SMI02-0211	2/2/2011 11:00 AM	2/4/2011 09:10 AM
MD3CW	3	VEECA-4SMI02T-0211	2/2/2011 11:00 AM	2/4/2011 09:10 AM
MD3CX	4	VEECA-4SMI01-0211	2/2/2011 12:15 PM	2/4/2011 09:10 AM
MD3C1	5	VEECA-4SMI02TT-0211	2/2/2011 11:00 AM	2/4/2011 09:10 AM
MENR6	6	Grinding Blank #1	2/2/2011 11:00 AM	2/4/2011 09:10 AM
MEWW1	7	VEECA-4SMI01-0211	2/2/2011 12:15 PM	2/4/2011 09:10 AM
MEWW5	8	VEECA-4SMI01-0211	2/2/2011 12:15 PM	2/4/2011 09:10 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B040475

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

G1B040475

TAL-4124 (1007)

Client: CH2M Hill	Project Manager: John Swenfurth	Date: 2/3/2011	Chain of Custody Number: 124993
Address: Camp Garcia Bldg 4525	Telephone Number (Area Code)/Fax Number: 813-281-7762	Lab Number	Page 1 of
City: Vieques; State: PR; Zip Code: 00705	Site Contact: 757-285-7685	Lab Contact: 757-376-5301 ~~57-212-9324~~	
Project Name and Location (State): ECA RI Vieques, PR	Carrier/Waybill Number: Fedex 8607 5366 7761		
Contract/Purchase Order/Quote No.: 408040, FI, FK, EC			

Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Explo 8330B	Explo 6850	Metals Total	Total Hexavalent Chromium	Explosives Vertical Profile	Metals Vertical Profile	Unknown pH	Special Instructions/ Conditions of Receipt
VEECA-EB01-020311-SMI	02/3/11	1000		X			4		1				2	1	1	1				Updated sample IDs per A. Burch 2/4/11
VEECA-4DU01-0211	02/02/11	1215				X	2										2		1	VEECA-4SMI01-0211
VEECA-4DU02TT-0211	02/02/11	1100				X	1											1		VEECA-4SMI02TT-0211
VEECA-4DU02T-0211	02/02/11	1100				X	1											1		VEECA-4SMI02T-0211

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Stephen G Burch	2/3/11	1200	1. Received By: Cheng Uke	02/04/11	0935
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

G1B040475

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

G1B040475

TAL-4124 (1007)

Client: CH2M Hill	Project Manager: John Swenforth	Date: 2/3/2011	Chain of Custody Number: 124994
Address: Camp Garcia Bldg 4525	Telephone Number (Area Code)/Fax Number: 813 281-7762	Lab Number	Page 1 of 1
City: Vieques; State: PR; Zip Code: 00765	Site Contact: 757-285-7685	Lab Contact: 7033765301	
Project Name and Location (State): ECA RI Vieques	Carrier/Waybill Number: Fedex 8607 5366 7772		
Contract/Purchase Order/Quote No.: 406040.FI.FK.EC			

Analysis (Attach list if more space is needed): Pesticides (8330 Nutrients); Metals (Total/PESTICIDES); Volatiles (PH)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Other	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Other	Pesticides (8330 Nutrients)	Metals (Total/PESTICIDES)	Volatiles (PH)	Special Instructions/ Conditions of Receipt: Updated sample IDs per A. Barch 2/4/11
VEECA-4DV02-0211	2/2/11	1100				X		X							1	3	1	VEECA-4SMI02-0211
VEECA-4DV02T-0211	2/2/11	1100				X		X							1	2	1	VEECA-4SMI02T-0211
VEECA-4DV01-0211	2/2/11	1215				X		X							1	1	1	VEECA-4SMI01-0211
VEECA-4DV02TT-0211	2/2/11	1100				X		X							1	2	1	VEECA-4SMI02TT-0211

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Stephen Brand	2/3/11	1200	1. Received By: Cheng Vue	02/04/11	0935
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

TestAmerica West Sacramento (916) 373 - 5600

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT Cirom Hill PM KS LOG # 69224

LOT# (QUANTIMS ID) G1B040475 QUOTE# 88113 LOCATION W19B

Checked (✓)

DATE RECEIVED 02/04/11 TIME RECEIVED 0910 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) See Multi Cooler Checklist ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☑

LV 02/04/11

Initials Date

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☑ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☐ N/A ☑

☐ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☑ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

LV 02/04/11

Initials Date

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): G1B040475

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600071 ☑

COC #(S) 124993 ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: ~~4~~ 3 CORRECTED 3 ☑
CW 02/04/11

SAMPLE TEMPERATURE:
OBSERVED: 2 1 2 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑ CW 02/04/11

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600088 ☑

COC #(S) 124994 ☑

TEMPERATURE BLANK: OBSERVED: 3 CORRECTED 3 ☑

SAMPLE TEMPERATURE:
OBSERVED: 2 3 3 AVERAGE: 3 CORRECTED 3 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑ CW 02/04/11

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐
CW 02/04/11

CUSTODY SEAL #(S) ☐

COC #(S) ☐

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:
OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

Initials Date

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: GIB040425

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	2																			
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ		3	3	3	3															
250AGJ																				
125AGJ																				
___CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn	1																			
500PJna																				
500PJzn/na																				
250PJ	2																			
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acic zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Angela Barch
Environmental Information Specialist
CH2M HILL

DATE: February 4, 2011

This memo is to document corrections made to entries on the Chains of Custody (COC) for Vieques ECA CTO - 037.

These corrections include the change in Sample ID for 4 samples.

VEECA-4DU01-0211	VEECA-4SMI01-0211
VEECA-4DU02-0211	VEECA-4SMI02-0211
VEECA-4DU02T-0211	VEECA-4SMI02T-0211
VEECA-4DU02TT-0211	VEECA-4SMI02TT-0211

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

MEMORANDUM **CH2MHILL**

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: February 7, 2011

This memo is to document corrections made to entries on the Chains of Custody (COC) for Vieques ECA CTO - 037.

The following analyses need to be cancelled for the samples listed:

G1B050467-3	VEECA-4SMI11T-0211	pH 9045C	2/3/11	13:20
G1B050467-5	VEECA-4SMI11TT-0211	pH 9045C	2/3/11	13:20
G1B040475-3	VEECA-4SMI02T-0211	pH 9045C	2/2/11	11:00
G1B040475-5	VEECA-4SMI02TT-0211	pH 9045C	2/2/11	11:00

Please correct the following Sample ID:

OK	VEECA-2SMI01-0211	VEECA-2SMI1-0211	2/4/11	10:00

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

MEMORANDUM **CH2MHILL**

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: March 4, 2011

This memo is to document corrections made to the Chains of Custody (COC) and laboratory log-ins for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

~~G1B120440-5~~
G1C040608

Sample ID	Analysis	Date	Time
VEECA-5SD01-000H-0211	TOC – Lloyd Kohn	2/10/2011	09:30
VEECA-5SD02-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:00
VEECA-5SD03-000H-0211	TOC – Lloyd Kohn	2/10/2011	11:05
VEECA-5SD04-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:45
VEECA-5SD05-000H-0211	TOC – Lloyd Kohn	2/9/2011	13:20
VEECA-5SD06-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:05
VEECA-5SD07-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:25
VEECA-5SD08-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:00
VEECA-5SD09-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:20
VEECA-5SD10-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:25
VEECA-5SD11-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:55
VEECA-5SD12-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:00
VEECA-5SD13-000H-0211	TOC – Lloyd Kohn	2/10/2011	16:00
VEECA-5SD14-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:25
VEECA-5SD15-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:35

The following samples need updated sample IDs, dates, and/or times:

G1B100573-5
G1B120440+C040608

Original Sample ID	Date	Time	Lab ID
VEECA-EB01-020911-SW	2/9/2011	07:00	MEAFV
VEECA-5SD01-000H-0211	2/10/11	09:30	MEDMQ
VEECA-5SD02-000H-0211	2/10/11	09:00	MEDMR
VEECA-5SD02P-000H-0211	2/10/11	09:00	MEDNM

17

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

G1B120440 +
G1C040608

	VEECA-5SD03-000H-0211	2/10/11	11:05	MEDMT	
	VEECA-5SD04-000H-0211	2/10/11	10:45	MEDMV	
	VEECA-5SD05-000H-0211	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-MS	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-SD	2/10/11	13:20	MEDMW	
	VEECA-5SD06-000H-0211	2/10/11	14:05 OK	MEDMX	
	VEECA-5SD07-000H-0211	2/10/11	14:25 (10:15)	MEDM0	
	VEECA-5SD08-000H-0211	2/10/11	15:00 (10:30)	MEDM1	
	VEECA-5SD09-000H-0211	2/10/11	12:20 (12:30)	MEDM2	
	VEECA-5SD10-000H-0211	2/10/11	10:25 (11:30)	MEDM3	
	VEECA-5SD11-000H-0211	2/10/11	09:55	MEDM4	
	VEECA-5SD11P-000H-0211	2/10/11	09:55	MEDNJ	216
	VEECA-5SD12-000H-0211	2/10/11	12:00	MEDM5	
	VEECA-5SD13-000H-0211	2/10/11	16:00	MEDNF	
	VEECA-5SD14-000H-0211	2/10/11	15:25	MEDNG	
	VEECA-5SD15-000H-0211	2/10/11	15:35	MEDNH	
G1B100573 - 2	VEECA-5SW02-0211	2/9/11	10:10	MEAFQ	✓
- 6	VEECA-5SW04-0211	2/9/11	11:35	MEAFW	✓
	VEECA-5SW04-0211-MS	2/9/11	11:35	MEAFW	✓
- 5	VEECA-EB01-020911-SW	2/9/11	07:00	MEAFV	✓
G1B190434 - 4	VEECA-6SMI05-0211	2/17/11	15:00	MEMJR	✓
G1B230594 - 1	VEECA-4SB01-001H-0211 *	2/18/11	08:30	MEQ97	✓
G1B040475 - 2	VEECA-4SMI02-0211 ✓	2/2/11 ✓	11:00 ✓	MD3CL	✓

* from VEECA-4SB01-TTBB-0211

COPYRIGHT 2011 BY CH2M HILL, INC. - COMPANY CONFIDENTIAL

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B040475

LAB: Test America- West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? __ ✓ __

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] __ ✓

Are the chromatograms free of interferences? [ ] __ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/2-3/11 Prep 2/8-15/11

8.0 Holding Times Rec'd 2/4/11 Analy 2/19/11

8.1 Have any nitroaromatics and nitroamines technical

Temp 1-3°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? Listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? Listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just Std dev + value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ LCS ✓ CRM

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓ LCS ✓ CRM

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

LABORATORY CONTROL SAMPLE EVALUATION REPORT

CRM

HPLC

Client Lot #...: G1B040475 Work Order #...: MEFE51AE Matrix.....: SOLID
LCS Lot-Sample#: G1B150000-152
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 08:53
Dilution Factor: 0.99

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,3,5-Trinitrobenzene	99	(58 - 116)	SW846 8330B
1,3-Dinitrobenzene	95	(69 - 116)	SW846 8330B
2,4,6-Trinitrotoluene	93	(69 - 120)	SW846 8330B
2,4-Dinitrotoluene	95	(69 - 137)	SW846 8330B
2,6-Dinitrotoluene	86	(60 - 121)	SW846 8330B
2-Amino-4,6-dinitrotoluene	86	(56 - 108)	SW846 8330B
2-Nitrotoluene	73	(67 - 117)	SW846 8330B
3-Nitrotoluene	64 a	(69 - 124)	SW846 8330B
4-Amino-2,6-dinitrotoluene	78	(46 - 98)	SW846 8330B
4-Nitrotoluene	70	(63 - 123)	SW846 8330B
HMX	96	(59 - 131)	SW846 8330B
Nitrobenzene	56 a	(58 - 119)	SW846 8330B
Nitroglycerin	76	(60 - 115)	SW846 8330B
PETN	90	(60 - 115)	SW846 8330B
RDX	99	(62 - 123)	SW846 8330B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	101	(81 - 127)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

052

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? no [ ] [✓] ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? lab [✓] ___ ___

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

4 Soil
out of 34

out high
J - NO⊕
No qual required

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable) recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

MATRIX SPIKE SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: G1B040475 Work Order #...: MD3CX1CJ-MS Matrix.....: SOLID
MS Lot-Sample #: G1B040475-004 MD3CX1CK-MSD
Date Sampled...: 02/02/11 12:15 Date Received..: 02/04/11
Prep Date.....: 02/15/11 Analysis Date..: 02/19/11
Prep Batch #...: 1046152 Analysis Time..: 14:09
Dilution Factor: 0.92

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
3,5-Dinitroaniline	97	(70 - 130)			SW846 8330B
	98	(70 - 130)	5.4	(0-20)	SW846 8330B
1,3,5-Trinitrobenzene	101	(75 - 125)			SW846 8330B
	101	(75 - 125)	4.0	(0-20)	SW846 8330B
1,3-Dinitrobenzene	99	(80 - 125)			SW846 8330B
	100	(80 - 125)	4.6	(0-20)	SW846 8330B
2,4,6-Trinitrotoluene	85	(55 - 140)			SW846 8330B
	86	(55 - 140)	4.7	(0-20)	SW846 8330B
2,4-Dinitrotoluene	98	(80 - 125)			SW846 8330B
	98	(80 - 125)	4.2	(0-20)	SW846 8330B
2,6-Dinitrotoluene	124 a	(80 - 120)			SW846 8330B
	122 a	(80 - 120)	3.1	(0-20)	SW846 8330B
2-Amino-4,6-dinitrotoluene	96	(80 - 125)			SW846 8330B
	96	(80 - 125)	4.5	(0-20)	SW846 8330B
2-Nitrotoluene	97	(80 - 125)			SW846 8330B
	96	(80 - 125)	2.6	(0-20)	SW846 8330B
3-Nitrotoluene	95	(75 - 120)			SW846 8330B
	96	(75 - 120)	4.9	(0-20)	SW846 8330B
4-Amino-2,6-dinitrotoluene	99	(80 - 125)			SW846 8330B
	99	(80 - 125)	4.6	(0-20)	SW846 8330B
4-Nitrotoluene	104	(75 - 125)			SW846 8330B
	103	(75 - 125)	3.6	(0-20)	SW846 8330B
HMX	97	(75 - 125)			SW846 8330B
	96	(75 - 125)	2.8	(0-20)	SW846 8330B
Nitrobenzene	101	(75 - 125)			SW846 8330B
	103	(75 - 125)	6.4	(0-20)	SW846 8330B
Nitroglycerin	132 a	(74 - 112)			SW846 8330B
	130 a	(74 - 112)	2.5	(0-20)	SW846 8330B
PETN	97	(75 - 117)			SW846 8330B
	94	(75 - 117)	0.70	(0-20)	SW846 8330B
RDX	89	(70 - 135)			SW846 8330B
	88	(70 - 135)	3.8	(0-20)	SW846 8330B
Tetryl	80	(10 - 150)			SW846 8330B
	81	(10 - 150)	5.6	(0-20)	SW846 8330B

(Continued on next page)

055

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-020311-SMI MOQ

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ✓ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ✓ ___ ___

b. All blanks ✓ ___ ___

c. Matrix spike samples ✓ ___ ___

d. 5 pt. initial calibration standards ✓ ___ ___

e. Calibration verification standards ✓ ___ ___

f. Laboratory Control samples (LCS) ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ✓ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

058

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ___ [✓]

not provided - only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

w/in 1 min

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs) must be < 20.0% for all analytes). [4] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [4] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [4] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked Cal in sequence and compared RT and checked stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run Log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

W/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

NO (X)

063

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement, the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate → VEECA-4SMI02-0211 MO⊕

Initial Calibration Date: 12/16/2010

RCF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 41.6200

Height of Compound	2081
Conc. of Compound	50
Calculated CF	41.620

Compound Name: nitrobenzene
Lab Value: 11.4

CF of STD 1	53.60
CF of STD 2	56.40
CF of STD 3	50.50
CF of STD 4	52.32
CF of STD 5	49.39
CF of STD 6	50.70
CF of STD 7	45.48
CF of STD 8	37.93
Calculated % RSD	11.4

Continuing Calibration File ID: 2/19/11, 17:51

RCF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	12884
Conc. of Compound	100
Calculated CF	128.840

Compound Name: tertyl
Lab Value: 4

Average CF	134.000
CF of CCV	128.840
Calculated % D	4

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

068

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

069

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

070

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	18:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.056	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 369480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.008	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.16	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

072

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/2-3/11
Received Date: 2/4/11
Prep Date: 2/22-23/11
Analysis Dates: 2/22-25/11
Cooler Temp: 1-3°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
≥ RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

Contamination was noted in one of the method and/or grinding blanks - qualifications required. Associated QC blanks were: VEECA-EB01-020311-SMI and VEECA-EB01-020411-SMI (no positive results exhibited).

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Reporting Limit
Grinding Blank: G1B230000-373 extraction 2/23/10	perchlorate	0.36J ug/kg	5.0 ug/kg
VEECA-EB01-020311-SMI	perchlorate	0.59 ug/L	0.25 ug/L

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

Sample ID	Compound	Q Flag	Qual Code
VEECA-4SMI02-0211, VEECA-4SMI02T-0211, VEECA-4SMI01-0211, VEECA-4SMI02TT-0211	perchlorate	report at value with U	EBL

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was not submitted for this data package

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was submitted for sample VEECA-4SMI02-0211—no positive results, no qualifications.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer L Mascellaro **Date:** 5/12/11

	YES	NO	N/A
A.I.I **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]		
Legible?	[✓]		
Signature of sample custodian present?	[✓]		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

077

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?		[ ]	✓
(d) Cyanide?		[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample? SMI Samples	✓		
Are percent solids calculations present for soils/sediments?		✓	
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

079

	YES	NO	N/A
A.1.9 Technical Holding Times: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?			✓
Mercury analysis(28 days) exceeded?			✓
Other Metals analysis(180 days)exceeded?		✓	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	✓		
Cyanide Analysis ≥ 12?			✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	✓		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the ~~CRQL~~ LOD s and coded with "U"?	[✓]	___	___
Are values less than the ~~CRQL~~ LOD s but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B040475

2/25, 1653

ICP - AES	
SAMPLE ID	VEECA-4SMI02-0211
ANALYTE	iron
Lab Value CONCENTRATION (mg/Kg)	21700
AMOUNT FROM RAW DATA (ug/ml)	86.201
SAMPLE SIZE (g)	0.992
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	21724.042

2/26, 1729

ICP-MS	
SAMPLE ID	VEECA-4SMI01-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	17.1
AMOUNT FROM RAW DATA (ug/L)	66.889691
SAMPLE SIZE (g)	0.979
FINAL VOLUME (L)	0.05
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	17.08113

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	___	✓
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

Dilutions were performed as necessary but this was not noted on Form Is.

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]	___	✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]	___	✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[ ]		✓
	Cyanide Analysis?	[ ]		✓
	ICP-AES(more than 2 point Calib.)?	[✓]		
	ICP-MS (more than 2 point calib.)?	[✓]		
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ". **NOTE**: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]		
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[ ]		✓
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]		
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[ ]		✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

see following pages for any necessary flags.

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	True Conc.	02/26/11 16:01 CCV 4 Found	%REC	02/26/11 16:07 CCV 5 Found	%REC	02/26/11 16:33 CCV 6 Found	%REC
Arsenic	100	107.00	107.0	99.72	99.7	99.19	99.2
Selenium	100	113.25	113.3	99.31	99.3	97.51	97.5
Thallium	50	48.66	97.3	49.95	99.9	49.41	98.8

NQ-no samples assoc

Lot Number: G1B040475 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	True Conc.	02/26/11 16:39 CCV 7 Found	%REC	02/26/11 17:06 CCV 8 Found	%REC	02/26/11 17:12 CCV 9 Found	%REC
Arsenic	100	99.45	99.4	98.95	98.9	98.53	98.5
Selenium	100	97.87	97.9	99.99	100.0	97.13	97.1
Thallium	50	49.99	100.0	49.30	98.6	49.69	99.4

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228B1

Analyte	True Conc.	02/28/11 09:50 ICV Found	%REC	02/28/11 16:17 ICV Found	%REC	02/28/11 16:27 ICV REPOUR Found	%REC
Arsenic	80	83.65	104.6	78.41	98.0	77.30	96.6
Selenium	80	82.46	103.1	81.70	102.1	77.79	97.2
Thallium	40			44.54	111.3	43.84	109.6

NQ - new ICV ran & all OK

Lot Number: G1B040475 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228A1A

Analyte	True Conc.	02/28/11 10:22 CCV 1 Found	%REC	02/28/11 10:30 CCV 2 Found	%REC	02/28/11 11:12 CCV 3 Found	%REC
Arsenic	100	100.06	100.1	99.90	99.9	100.25	100.2
Selenium	100	99.32	99.3	98.76	98.8	100.14	100.1

TAL West Sac

CALIBRATION REPORT

Method: 6020 (SOP: SAC-MT-001) M02 Reported: 03/04/11 08:52:36

Department: 120 (Metals) Source: MetEdit

Sample: **CCV 18 (CCV)** Mult: **1.00** Dilf: **1.00** Divs: **1.000**

Instrument: **ICPMS M02** Channel 262
File: 110208A2 # 110 Method 6020_
Acquired: 02/08/2011 20:48:05 M02
Calibrated: 02/08/2011 20:00:10 Units: ug/L

CASN	Analyte Name	M/S	Area	Found	True	%R	Q
7440-38-2	Arsenic	75	258296	109.08	100.00	109	
7782-49-2	Selenium	78	91204	124.64	100.00	125	NQ
7782-49-2	Selenium	82	32134	126.00	100.00	126	
7440-36-0	Antimony	121	386315	48.983	50.000	98.0	
7440-28-0	Thallium	205	1400905	50.769	50.000	102	
7439-92-1	Lead	208	3708589	100.58	100.00	101	

CASN	ISTD Name	M/S	Area	Amount	Q
7440-56-4	Germanium	72	1057607		☑
7440-74-6	Indium	115	1315258		☑
7440-30-4	Thulium	169	1118489		☑

No samples assoc.

Reviewed by: Date:

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** P05

Units: ug/L **Datafile Name:** FEB0911AX.csv

Analyte	True Conc.	02/09/11 13:48 ICV4 Found	%REC
Aluminum	10000	9988.9	99.9
Antimony	250	254.70	101.9
Barium	1000	1042.7	104.3
Beryllium	250	245.56	98.2
Cadmium	250	264.20	105.7
Calcium	10000	10175	101.8
Chromium	1000	1018.1	101.8
Cobalt	1000	1031.4	103.1
Copper	1000	999.04	99.9
Iron	10000	10536	105.4
	10000	10221	102.2
Lead	250	254.84	101.9
Magnesium	10000	10080	100.8
Manganese	1000	1003.9	100.4
Nickel	1000	1048.8	104.9
Potassium	10000	9429.6	94.3
Silver	250	253.26	101.3
Sodium	10000	11350	113.5
Vanadium	1000	1040.7	104.1
Zinc	1000	1043.1	104.3

NQ - no + result in assoc sample -001

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** P05

Units: ug/L **Datafile Name:** FEB0911AX.csv

Analyte	True Conc.	02/09/11 15:10 CCV Found	%REC	02/09/11 15:30 CCV Found	%REC	02/09/11 16:16 CCV Found	%REC
Aluminum	25000	25881	103.5	25428	101.7	25153	100.6
Antimony	500	515.25	103.1	521.95	104.4	524.23	104.8
Barium	2500	2617.8	104.7	2586.2	103.4	2544.8	101.8
Beryllium	500	514.17	102.8	504.97	101.0	502.15	100.4
Cadmium	500	527.34	105.5	519.51	103.9	512.46	102.5
Calcium	25000	26731	106.9	26384	105.5	26197	104.8
Chromium	2500	2561.1	102.4	2540.0	101.6	2480.6	99.2
Cobalt	2500	2651.9	106.1	2638.8	105.6	2581.2	103.2
Copper	2500	2477.1	99.1	2471.1	98.8	2459.2	98.4
Iron	25000	26149	104.6	26271	105.1	26105	104.4
	25000	27676	110.7	27243	109.0	26491	106.0
Lead	500	491.84	98.4	494.96	99.0	487.27	97.5
Magnesium	25000	27724	110.9	27312	109.2	26303	105.2
Manganese	2500	2714.1	108.6	2685.8	107.4	2598.3	103.9
Nickel	2500	2659.4	106.4	2622.5	104.9	2587.1	103.5
Potassium	25000	25091	100.4	24594	98.4	24481	97.9
Silver	500	523.83	104.8	517.07	103.4	508.65	101.7
Sodium	25000	25918	103.7	25531	102.1	25338	101.4
Vanadium	2500	2624.6	105.0	2615.9	104.6	2633.1	105.3
Zinc	2500	2655.5	106.2	2619.7	104.8	2582.9	103.3

NQ no samples assoc. with non-compliant CCV

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475

Units: ug/L

Instrument Id: P05

Datafile Name: FEB1111BX.csv

Analyte	True Conc.	02/11/11 10:46 ICV4 Found	%REC
Aluminum	10000	9897.7	99.0
Antimony	250	250.86	100.3
Barium	1000	1011.9	101.2
Beryllium	250	243.10	97.2
Cadmium	250	256.93	102.8
Calcium	10000	10415	104.1
Chromium	1000	992.51	99.3
Cobalt	1000	1017.6	101.8
Copper	1000	970.75	97.1
Iron	10000	10343	103.4
	10000	10540	105.4
Lead	250	248.41	99.4
Magnesium	10000	10265	102.6
Manganese	1000	1018.8	101.9
Nickel	1000	1009.0	100.9
Potassium	10000	9543.1	95.4
Silver	250	246.79	98.7
Sodium	10000	11301	113.0
Vanadium	1000	1018.3	101.8
Zinc	1000	1004.5	100.5

NQ - no samples assoc. with non-compliant CCV

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** T01

Units: ug/L **Datafile Name:** 022411

Analyte	True Conc.	02/24/11 15:43 ICV4 Found	%REC
Aluminum	10000	9849.9	98.5
	10000	9676.9	96.8
Antimony	250	249.25	99.7
Barium	1000	1004.9	100.5
Beryllium	250	245.43	98.2
Cadmium	250	253.90	101.6
	250	253.20	101.3
Calcium	10000	10399	104.0
Chromium	1000	1003.0	100.3
Cobalt	1000	1019.1	101.9
Copper	1000	977.75	97.8
Iron	10000	10762	107.6
	10000	10656	106.6
Lead	250	262.14	104.9
Magnesium	10000	9830.3	98.3
Manganese	1000	1036.7	103.7
Nickel	1000	1028.0	102.8
Potassium	10000	10037	100.4
Silver	250	243.33	97.3
Sodium	10000	11624	116.2
Vanadium	1000	979.17	97.9
Zinc	1000	997.29	99.7

006 - Grinding Blank only - no quals

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B040475 **Instrument Id:** T01

Units: ug/L **Datafile Name:** 022511

Analyte	True Conc.	02/25/11 15:20 ICV4 Found	%REC
Aluminum	10000	9877.9	98.8
	10000	9809.6	98.1
Antimony	250	248.84	99.5
Barium	1000	1009.9	101.0
Beryllium	250	248.10	99.2
Cadmium	250	253.70	101.5
	250	252.10	100.8
Calcium	10000	10417	104.2
Chromium	1000	1002.0	100.2
Cobalt	1000	1016.4	101.6
Copper	1000	975.37	97.5
Iron	10000	10755	107.6
	10000	10739	107.4
Lead	250	258.76	103.5
Magnesium	10000	9824.5	98.2
Manganese	1000	1037.1	103.7
Nickel	1000	1039.5	104.0
Potassium	10000	10060	100.6
Silver	250	243.11	97.2
Sodium	10000	11638	116.4
Vanadium	1000	980.18	98.0
Zinc	1000	1009.5	101.0

J+ results for Na in all soils

Form 2 ICV/CCV Equivalent

CH2M Hill Inc

Interference Check Standard A

Instrument Id: M01

Lot Number: G1B040475

Datafile Name: 110228A1A

Units: ug/L

Analyte	Spike Amount	ICSA 02/28/11 10:06 Found	ICSA 02/28/11 16:40 Found
Arsenic	0	0.61	1.01
Selenium	0	1.40	-4.97
Thallium	0		0.13

Grinding blank only
No Quals

Instrument Id: M01

Lot Number: G1B040475

Datafile Name: 110228B1

Units: ug/L

Analyte	Spike Amount	ICSA 02/28/11 17:13 Found
Arsenic	0	0.67
Selenium	0	0.72
Thallium	0	0.12

094

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? **(Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)**	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
*** True value of the CRQL Standard**

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab method / SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:19 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B160524_LLQS.pdf; G1B040475_LLQS.pdf; G1B230594_LLQS.pdf; G1B190434_LLQS.pdf; G1B180604_LLQS.pdf

Good afternoon Jackie,
Attached are the LLQS data for 5 of the projects. I'll send the others in following e-mails. Please note that the 6010 data is from instrument Thermo and PO5 and the 6020 data is from M01 & M02. The file name and time will on these forms will help you associate them back to the run logs. Please let me know if you have any questions.

I'll follow up with the production group on the status of the other forms you're awaiting – Explosives Form X equivalent and retention time windows forms.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTEN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for: in assoc. standards			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

		YES	NO	N/A
A.1.14.1	Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
	Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
	Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
	Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

098

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	___	[✓]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:
1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

	YES	NO	N/A
A.1.15.1 Was one Preparation Blank prepared with and analyzed for:			
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

	YES	NO	N/A
A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL?	___	[✓]	___

ACTION:
If yes, change sample result ≥ MDL

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

See next page for notes/action regarding the assoc. grinding blank.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	Grinding Blank #1
Lot Number:	G1B040475	**Lab WorkOrder:**	MENR6
Matrix:	WATER	**Lab Sample ID:**	G1B040475006
% Solids:	0.0	**Date/Time Collected:**	02/02/11 11:00
Units:	UG/L	**Date/Time Received:**	02/04/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method	
7429-90-5	Aluminum	100.0000	U		P	
7440-36-0	Antimony	20.0000	U		P	
7440-38-2	Arsenic	2.0000	U		P	
7440-39-3	Barium	5.0000	U		P	
7440-41-7	Beryllium	1.0000	U		P	
7440-43-9	Cadmium	1.0000	U		P	
7440-70-2	Calcium	1320.0000			P	NQ
7440-47-3	Chromium	5.0000	U		P	
7440-48-4	Cobalt	5.0000	U		P	
7440-50-8	Copper	11.4000	J		P	J all > blk up to 10X blk
7439-89-6	Iron	50.0000	U		P	
7439-92-1	Lead	5.0000	U		P	
7439-95-4	Magnesium	189.0000	J		P	NQ
7439-96-5	Manganese	3.5000	J		P	↓
7440-02-0	Nickel	5.0000	U		P	
7440-09-7	Potassium	269.0000	J		P	NQ
7782-49-2	Selenium	2.5000	U		P	
7440-22-4	Silver	2.0000	U		P	
7440-23-5	Sodium	779.0000	J		P	J all > blk up to 10 X blk
7440-28-0	Thallium	0.8000	JB		P	NQ
7440-62-2	Vanadium	5.0000	U		P	
7440-66-6	Zinc	5.9000	J		P	NQ

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.

DF considered in applying action levels JAC 4/26/11

Form I Analysis Data Sheet Equivalent

102

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV** **NOTE**: Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form 1V?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution**:
For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value? [✓] ___ ___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

106

VEECA-4SMI15-0211

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B040475	**MS Lab Workorder:**	MD4RX - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001S
% Solids	0.0	**QC Batch ID:**	1055301
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	40600.0000	N	33900.0000		101.0000	6700.0	N	P	NQ*
Antimony	80 - 120	10.3000	N	10.0000		25.2000	37.0	N	P	JNJ
Barium	80 - 120	136.0000		43.2000		101.0000	92.0		P	
Beryllium	80 - 120	3.2800		0.9700		2.5200	91.0		P	
Cadmium	80 - 120	2.2700		0.1500	J	2.5200	84.0		P	
Calcium	80 - 120	29800.0000	N	26300.0000		2520.0000	137.0	N	P	NQ*
Chromium	80 - 120	71.7000	N	59.4000		10.1000	123.0	N	P	NQ MSD OK
Cobalt	80 - 120	32.5000		10.5000		25.2000	87.0		P	
Copper	80 - 120	31.8000		19.9000		12.6000	95.0		P	
Iron	80 - 120	39800.0000	N	38000.0000		50.4000	3480.0	N	P	NQ
Lead	80 - 120	37.0000		15.0000		25.2000	88.0		P	
Magnesium	80 - 120	9750.0000		7140.0000		2520.0000	104.0		P	
Manganese	80 - 120	867.0000		838.0000		25.2000	115.0		P	
Nickel	80 - 120	40.4000		17.1000		25.2000	92.0		P	
Potassium	80 - 120	10300.0000	N	7170.0000		2520.0000	123.0	N	P	NQ MSD OK
Silver	75 - 120	1.9200		1.0000		2.5200	76.0		P	
Sodium	80 - 120	2920.0000		658.0000		2520.0000	90.0		P	
Vanadium	80 - 120	95.8000		67.6000		25.2000	112.0		P	
Zinc	80 - 120	66.7000		41.9000		25.2000	98.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

107

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B040475	**MS Lab Workorder:**	MD4RX - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001D
% Solids	0.0	**QC Batch ID:**	1055301
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	39600.0000	N	33900.0000		101.0000	5610.0	N	P	NQ*
Antimony	80 - 120	9.6000	N	10.0000		25.3000	33.0	N	P	J7W
Barium	80 - 120	134.0000		43.2000		101.0000	90.0		P	
Beryllium	80 - 120	3.2200		0.9700		2.5300	89.0		P	
Cadmium	80 - 120	2.2800		0.1500	J	2.5300	84.0		P	
Calcium	80 - 120	30700.0000	N	26300.0000		2530.0000	173.0	N	P	NQ
Chromium	80 - 120	70.4000		59.4000		10.1000	110.0		P	
Cobalt	80 - 120	32.1000		10.5000		25.3000	85.0		P	
Copper	80 - 120	32.3000		19.9000		12.6000	98.0		P	
Iron	80 - 120	38800.0000	N	38000.0000		50.6000	1440.0	N	P	NQ*
Lead	80 - 120	37.0000		15.0000		25.3000	87.0		P	
Magnesium	80 - 120	9760.0000		7140.0000		2530.0000	104.0		P	
Manganese	80 - 120	847.0000	N	838.0000		25.3000	35.0	N	P	NQ
Nickel	80 - 120	39.9000		17.1000		25.3000	90.0		P	MSO*
Potassium	80 - 120	10100.0000		7170.0000		2530.0000	115.0		P	
Silver	75 - 120	1.9300		1.0000		2.5300	76.0		P	
Sodium	80 - 120	2920.0000		658.0000		2530.0000	89.0		P	
Vanadium	80 - 120	94.0000		67.6000		25.3000	105.0		P	
Zinc	80 - 120	70.5000		41.9000		25.3000	113.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

108

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	✓	[___]	___
ACTION: If yes for any of the above, proceed as follows:			
If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (**NOTE**:Replace "N" with "J" or "R" as appropriate.)			
A.1.18 **Lab Duplicates) - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD pair RPD's calculated

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier)on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			

A.1.18.4 **Aqueous**

A.1.18.4.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE:** Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A

QC criteria stated in Sections A.1.19.2 and A.1.19.3.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	___

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5	Circle on each Appendix A.4 all values that have: RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI02-0211
Duplicate Sample ID: VEECA-4SMI02T-0211
Triplicate Sample ID: VEECA-4SMI02TT-0211

Water: RSD>30%
Soil: RSD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	16200	16000	16200	115.47	16133.33	1%
barium	20.5	20.6	21	0.26	20.70	1%
beryllium	0.19	0.18	0.2	0.01	0.19	5%
cadmium				#DIV/0!	#DIV/0!	#DIV/0!
calcium	119000	129000	121000	5291.50	123000.00	4%
chromium	39.9	38.7	39.9	0.69	39.50	2%
cobalt	4.5	4.3	4.5	0.12	4.43	3%
copper	22.2	20.1	21.3	1.05	21.20	5%
iron	21700	20600	21400	568.62	21233.33	3%
lead	2.1	1.7	2.2	0.26	2.00	13%
magnesium	15800	15600	16500	472.58	15966.67	3%
manganese	552	538	561	11.59	550.33	2%
nickel	11.7	11.3	11.5	0.20	11.50	2%
potassium	2920	2760	2860	80.83	2846.67	3%
sodium	718	756	814	48.35	762.67	6%
vanadium	51.1	49.3	51.3	1.10	50.57	2%
zinc	32.6	32.1	32	0.32	32.23	1%
arsenic	33.9	35	36.1	1.10	35.00	3%
thallium				#DIV/0!	#DIV/0!	#DIV/0!
selenium	0.71	0.71	0.57	0.08	0.66	12%

COMMENTS: No qualifications required.

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
A.1.20	**Laboratory Control Sample (LCS)- Form VII**			
A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[___]	___	___
	Each batch samples digested/distilled?	[___]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[___]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

116

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[ ]	___
Between 121% and 150%?	___	[ ]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

117

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: Designate "Field Blank" as such on Form I

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	✓	[___]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).	Tl 1.7		
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

no Quals needed based on rinse blank.

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results) greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CLQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	✓
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

Dilutions were performed as needed!

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 per SAP of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed? Samples were diluted as necessary	[___]	___	___
Was the %RI for the two fold diluted sample within the acceptance limits (60-125%)?	[✓]	___	___

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/2-2/3
Received Date: 2/4, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/17 soils
Analysis Dates: 2//17 soils; 2/4 waters

All holding time requirements were met.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B040475-006	hexavalent chromium	2.1J ug/L – 0.0105 mg/Kg	LOD

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code
VEECA-4SMI01-0211	hexavalent chromium	U at LOD	GBL

MATRIX SPIKE/DUPLICATE SUMMARY

There was no MS/MSD pair submitted in this SDG. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No field duplicate pairs were submitted.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the samples in this SDG. A sample triplicate was performed and assessed. No positive results were reported in the triplicate samples. Clarification of the calculations was requested from the laboratory. No additional qualifications to the data were required.

1 calc exp. received from lab 5/3/11

Reviewer JCleveland **Date:** 4/26/11

CH2M Hill Inc

Client Sample ID: Grinding Blank #1

General Chemistry

Lot-Sample #...: G1B040475-006 **Work Order #...:** MENR6 **Matrix.....:** WATER
Date Sampled...: 02/02/11 11:00 **Date Received..:** 02/04/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	2.1 J	10.0	ug/L	SW846 7196A	02/17/11	1057081

Dilution Factor: 1 Analysis Time..: 16:38 DL.....: 2.0

NOTE(S):

RL Reporting Limit

J Estimated result. Result is less than RL.

$2.1J\ ug/L * \frac{0.04L}{8g} = 0.0105\ mg/kg$

U @ LOD in VEECA-4SMI01-0211

Hexavalent Chromium Calcs - ICAL soils - 2/17/11

X - Response	Y - Concentration (mg/L)
0	0
0.004	0.005
0.008	0.01
0.021	0.025
0.04	0.05
0.079	0.1

slope, m (A1) =	1.266070637
y-int. (A0) =	-0.000407123
r =	0.999864515
Rr2=	0.999729049

VEECA-4SMI01-0211 Lab Value - 0.011 mg/Kg

Response = 0.002

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.002125018 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.01
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.010611825 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B050467, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B050467. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-4SMI15-0211	G1B050467-001	soil	X	X	X	X	X
VEECA-4SMI11T-0211	G1B050467-003	soil	X	X	X	X	X
VEECA-4SMI11-0211	G1B050467-004	soil	X	X	X	X	X
VEECA-4SMI11TT-0211	G1B050467-005	soil	X	X	X	X	X
VEECA-4SMI12-0211	G1B050467-006	soil	X	X	X	X	X
VEECA-2SMI01-0211	G1B050467-007	soil	X	X	X	X	X
VEECA-4SMI13-0211	G1B050467-008	soil	X	X	X	X	X
VEECA-4SMI140211	G1B050467-009	soil	X	X	X	X	X
VEECA-EB01-020411-SMI	G1B050467-002	water	X	X	X	X	X
VEECA-EB02-020411-SMI	G1B050467-010	water	X	X	X	X	X
VEECA-4SMI140211 MS	G1B050467-009MS	soil	X	X	X	X	X
VEECA-4SMI140211 MSD	G1B050467-009MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB01-020411-SMI and VEECA-EB02-020411-SMI – equipment blanks; and samples VEECA-4SMI11T-0211 and VEECA-4SMI11TT-0211-field triplicates of sample VEECA-4SMI11-0211.

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

The Certified Reference Material (CRM) exhibited low recoveries for two compounds that resulted in qualifying the non-detected results as rejected in all samples.

One sample reported positive results required qualification based on column quantitation %Ds greater than 40%.

Perchlorate

Due to grinding blank contamination, qualifications were added to the data.

Metals

Sample results were qualified due to grinding blank contamination.

The submitted MS/MSD pair associated with the soil samples exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

Please note – several samples with reported results between the LOD and the LOQ were missing J flags. These flags were added to the form 1 equivalents by the validator. This action did not require any qualification flags. Also, selenium was flagged by the laboratory with a B flag. This flag appears to be a typographical error because the associated blanks did not exhibit contamination. Therefore these B flagged were crossed out by the reviewer.

Hexavalent Chromium

Two rinse blank samples were analyzed more than 48 hours outside the 24 hour holding time. The reported results in these samples were rejected R.

Two samples required qualification due to contamination in the associated grinding blank.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/3-4/11 and samples were received at the laboratory on 2/5/11. All sample preparation and analysis was

performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Samples VEECA-EB01-020411-SMI and VEECA-EB02-020411-SMI exceeded the 24 hour holding time by more than 48 hours. Therefore the reported non-detect results were rejected R with a qualifier code of HT.

Blanks

Perchlorate

The associated method, grinding and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Compound	Concentration	Reporting Limit
Grinding Blank: G1B230000-373 extraction 2/23/10	perchlorate	0.36J ug/kg	5.0 ug/kg

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

Sample ID	Compound	Q Flag	Q Code
VEECA-4SMI11T-0211, VEECA-4SMI11-0211, VEECA-4SMI11TT-0211, VEECA-4SMI12-0211, VEECA-2SMI01-0211	perchlorate	report at value with U	GBL
VEECA-4SMI15-0211, VEECA-4SMI13-0211, VEECA-4SMI14-0211	perchlorate	report at LOD with U	GBL

Metals

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank: G1B050467011	copper sodium	11.6J ug/L or 0.58 mg/Kg 779J ug/L or 39 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg

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

Sample ID	Analyte	Q Flag	Q Code
all field samples	copper	J	GBL
all field samples except VEECA-2SMI1-0211	sodium	J	GBL

Hexavalent Chromium

The associated preparation, grinding and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Analyte	Concentration	Action Level
Grinding Blank #1	hexavalent chromium	2.1 J ug/L	LOD

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

Sample ID	Analyte	Q Flag	Q Code
VEECA-4SBMI15-0211, VEECA-4SBMI13-0211	hexavalent chromium	U at LOD	GBL

Certified Reference Material

Explosives

The CRM associated with all samples exhibited low recoveries for 3-nitrotoluene at 64% (QC limit 69-124%) and nitrobenzene at 56% (58-119%); therefore all positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R), qualifier code: CRML.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for two analytes that resulted in qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SMI15-0211	arsenic	all soil samples	65/69	J/UJ	MSL
	antimony		37/33		

Identification/Quantitation

Explosives

Qualifications were required in the samples due to high (>40%) column quantitation %Ds. Region II guidelines were followed in applying these qualifications. Sample results were flagged as noted in the following table below.

Sample ID	Compound	Column Quant %D	Qualifier	Q Code
VEECA-4SMI15-0211	3,5-dinitroaniline	66	J	2C

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
all samples	3-nitrotoluene nitrobenzene	+/-	J/R	CRML
VEECA-4SMI15-0211	3,5-dinitroaniline	–	J	2C

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
VEECA-4SMI11T-0211, VEECA-4SMI11-0211, VEECA-4SMI111T-0211, VEECA-4SMI12-0211, VEECA-2SMI01-0211	perchlorate	+	report at value with U	GBL
VEECA-4SMI15-0211, VEECA-4SMI13-0211, VEECA-4SMI14-0211	perchlorate	–	report at LOD with U	GBL

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all field samples	copper	+	J	GBL
all field samples except VEECA-2SMI1-0211	sodium	+	J	GBL
all soil samples	antimony arsenic	+/-	J/UJ	MSL

Hexavalent Chromium

Sample ID	Compound	Results	Q flag	Q Code
VEECA-EB01-020411-SMI, VEECA-EB02-020411-SMI	hexavalent chromium	-	UJ	BT
VEECA-4SMI15-0211, VEECA-4SMI13-0211	hexavalent chromium	+J	U at LOD	GBL

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

CH2M Hill Inc

Client Sample ID: VEECA-4SMI15-0211

HPLC

Lot-Sample #...: G1B050467-001 Work Order #...: MD4RX1A2 Matrix.....: SOLID
Date Sampled...: 02/03/11 09:40 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 16:19
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	13 ~~J,PG~~ J,2C	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R,CRML	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R CRML	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

MM 051111

011

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11T-0211

HPLC

Lot-Sample #...: G1B050467-003 Work Order #...: MD4R11AD Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 20:04
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R CRML	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R CRML	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11-0211

HPLC

Lot-Sample #...: G1B050467-004 Work Order #...: MD4R21AD Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 21:34
Dilution Factor: 1.03

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	31 U	260	ug/kg	9.1
1,3,5-Trinitrobenzene	31 U	260	ug/kg	10
1,3-Dinitrobenzene	31 U	260	ug/kg	4.3
2,4,6-Trinitrotoluene	31 U	260	ug/kg	20
2,4-Dinitrotoluene	31 U	260	ug/kg	5.5
2,6-Dinitrotoluene	31 U	260	ug/kg	7.5
2-Amino-4,6-dinitrotoluene	31 U	260	ug/kg	13
2-Nitrotoluene	31 U	260	ug/kg	13
3-Nitrotoluene	31 ~~U~~ R CRML	260	ug/kg	16
4-Amino-2,6-dinitrotoluene	31 U	260	ug/kg	10
4-Nitrotoluene	31 U	260	ug/kg	19
HMX	31 U	260	ug/kg	12
Nitrobenzene	31 ~~U~~ R CRML	260	ug/kg	18
Nitroglycerin	62 U	520	ug/kg	15
PETN	62 U	520	ug/kg	26
RDX	31 U	260	ug/kg	12
Tetryl	31 U	260	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	115	(81 - 127)

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11TT-0211

HPLC

Lot-Sample #...: G1B050467-005 Work Order #...: MD4R31AD Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 22:19
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R CRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R CRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	99	(81 - 127)

MM 05/11/11

014

CH2M Hill Inc

Client Sample ID: VEECA-4SMI12-0211

HPLC

Lot-Sample #...: G1B050467-006 Work Order #...: MD4R41AD Matrix.....: SOLID
Date Sampled...: 02/04/11 09:06 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 23:05
Dilution Factor: 0.94
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	240	ug/kg	8.3
1,3,5-Trinitrobenzene	28 U	240	ug/kg	9.4
1,3-Dinitrobenzene	28 U	240	ug/kg	3.9
2,4,6-Trinitrotoluene	28 U	240	ug/kg	18
2,4-Dinitrotoluene	28 U	240	ug/kg	5.0
2,6-Dinitrotoluene	28 U	240	ug/kg	6.9
2-Amino-4,6-dinitrotoluene	28 U	240	ug/kg	12
2-Nitrotoluene	28 U	240	ug/kg	12
3-Nitrotoluene	28 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	28 U	240	ug/kg	9.4
4-Nitrotoluene	28 U	240	ug/kg	17
HMX	28 U	240	ug/kg	11
Nitrobenzene	28 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	56 U	470	ug/kg	14
PETN	56 U	470	ug/kg	24
RDX	28 U	240	ug/kg	11
Tetryl	28 U	240	ug/kg	9.4

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-2SMI01-0211

HPLC

Lot-Sample #...: G1B050467-007 Work Order #...: MD4R91AD Matrix.....: SOLID
Date Sampled...: 02/04/11 10:00 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 23:50
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.6
1,3-Dinitrobenzene	29 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.0
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	12
3-Nitrotoluene	29 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.6
4-Nitrotoluene	29 U	240	ug/kg	17
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	14
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.6

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-4SMI13-0211

HPLC

Lot-Sample #...: G1B050467-008 Work Order #...: MD4TA1AD Matrix.....: SOLID
Date Sampled...: 02/03/11 11:16 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047106 Analysis Time..: 00:35
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.6
1,3-Dinitrobenzene	29 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.0
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	12
3-Nitrotoluene	29 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.6
4-Nitrotoluene	29 U	240	ug/kg	17
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	14
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.6

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

MM 05/11/11

017

CH2M Hill Inc

Client Sample ID: VEECA-4SMI14-0211

HPLC

Lot-Sample #...: G1B050467-009 Work Order #...: MD4TC1AD Matrix.....: SOLID
Date Sampled...: 02/03/11 10:35 Date Received..: 02/05/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047106 Analysis Time..: 01:20
Dilution Factor: 1.02

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	31 U	260	ug/kg	9.0
1,3,5-Trinitrobenzene	31 U	260	ug/kg	10
1,3-Dinitrobenzene	31 U	260	ug/kg	4.3
2,4,6-Trinitrotoluene	31 U	260	ug/kg	20
2,4-Dinitrotoluene	31 U	260	ug/kg	5.4
2,6-Dinitrotoluene	31 U	260	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	31 U	260	ug/kg	13
2-Nitrotoluene	31 U	260	ug/kg	13
3-Nitrotoluene	31 ~~U~~ R CRML	260	ug/kg	16
4-Amino-2,6-dinitrotoluene	31 U	260	ug/kg	10
4-Nitrotoluene	31 U	260	ug/kg	19
HMX	31 U	260	ug/kg	12
Nitrobenzene	31 ~~U~~ R LRML	260	ug/kg	18
Nitroglycerin	61 U	510	ug/kg	15
PETN	61 U	510	ug/kg	26
RDX	31 U	260	ug/kg	12
Tetryl	31 U	260	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 05/11/11

UTS

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020411-SMI

HPLC

Lot-Sample #...: G1B050467-002 Work Order #...: MD4R01A4 Matrix.....: WATER
Date Sampled...: 02/04/11 09:00 Date Received..: 02/05/11
Prep Date.....: 02/08/11 Analysis Date..: 02/19/11
Prep Batch #...: 1039362 Analysis Time..: 21:39
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
1,3,5-Trinitrobenzene	0.048 U	0.096	ug/L	0.030
1,3-Dinitrobenzene	0.048 U	0.14	ug/L	0.048
2,4,6-Trinitrotoluene	0.048 U	0.14	ug/L	0.048
2,4-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2,6-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2-Amino-4,6-dinitrotoluene	0.096 U	0.29	ug/L	0.096
2-Nitrotoluene	0.096 U	0.96	ug/L	0.084
3-Nitrotoluene	0.096 ~~U~~ RCRML	0.48	ug/L	0.055
4-Amino-2,6-dinitrotoluene	0.048 U	0.14	ug/L	0.048
4-Nitrotoluene	0.096 U	0.96	ug/L	0.084
HMX	0.048 U	0.14	ug/L	0.035
Nitrobenzene	0.048 ~~U~~ RCRML	0.14	ug/L	0.048
Nitroglycerin	0.48 U	0.96	ug/L	0.32
PETN	0.48 U	0.96	ug/L	0.29
RDX	0.048 U	0.24	ug/L	0.035
Tetryl	0.048 U	0.14	ug/L	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(84 - 125)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020411-SMI

HPLC

Lot-Sample #...: G1B050467-010 Work Order #...: MD4TD1AF Matrix.....: WATER
Date Sampled...: 02/04/11 11:35 Date Received..: 02/05/11
Prep Date.....: 02/08/11 Analysis Date..: 02/19/11
Prep Batch #...: 1039362 Analysis Time..: 22:25
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
1,3,5-Trinitrobenzene	0.049 U	0.098	ug/L	0.030
1,3-Dinitrobenzene	0.049 U	0.15	ug/L	0.049
2,4,6-Trinitrotoluene	0.049 U	0.15	ug/L	0.049
2,4-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2,6-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2-Amino-4,6-dinitrotoluene	0.098 U	0.29	ug/L	0.098
2-Nitrotoluene	0.098 U	0.98	ug/L	0.086
3-Nitrotoluene	0.098 ~~U~~ RCRML	0.49	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.049 U	0.15	ug/L	0.049
4-Nitrotoluene	0.098 U	0.98	ug/L	0.086
HMX	0.049 U	0.15	ug/L	0.035
Nitrobenzene	0.049 ~~U~~ RCRML	0.15	ug/L	0.049
Nitroglycerin	0.49 U	0.98	ug/L	0.32
PETN	0.49 U	0.98	ug/L	0.29
RDX	0.049 U	0.24	ug/L	0.035
Tetryl	0.049 U	0.15	ug/L	0.049

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(84 - 125)

MM 05/11/11

026

CH2M Hill Inc

Client Sample ID: VEECA-4SMI15-0211

HPLC

Lot-Sample #...:	G1B050467-001	**Work Order #...:**	MD4RX1A3	**Matrix.....:**	SOLID
Date Sampled...:	02/03/11 09:40	**Date Received..:**	02/05/11		
Prep Date.....:	02/23/11	**Analysis Date..:**	02/25/11		
Prep Batch #...:	1054373	**Analysis Time..:**	04:54		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

0.40 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.32 J,B~~	5.0	ug/kg	0.26

NOTE(S): ~~5.0 U, GBL~~ MM 05/12/11

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 04/21/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11T-0211

HPLC

Lot-Sample #...:	G1B050467-003	Work Order #...:	MD4R11AE	Matrix.....:	SOLID
Date Sampled...:	02/03/11 13:20	Date Received..:	02/05/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/25/11		
Prep Batch #...:	1054373	Analysis Time..:	16:52		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

0.51U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.51 J,B~~	5.0	ug/kg	0.26

~~5.0 U GBL~~ LM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

LM 04/21/11

022

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11-0211

HPLC

Lot-Sample #...: G1B050467-004 Work Order #...: MD4R21AE Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 06:04
Dilution Factor: 1.06
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.52 J,B~~ 0.52U, GBL ~~5.3U, GBL~~ MM 05/2/11	5.3	ug/kg	0.28

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 04/21/11

CH2M Hill Inc

Client Sample ID: VKECA-4SMI11TT-0211

HPLC

Lot-Sample #...:	G1B050467-005	**Work Order #...:**	MD4R31AE	**Matrix.....:**	SOLID
Date Sampled...:	02/03/11 13:20	**Date Received..:**	02/05/11		
Prep Date.....:	02/23/11	**Analysis Date..:**	02/25/11		
Prep Batch #...:	1054373	**Analysis Time..:**	06:21		
Dilution Factor:	0.93				
		Method.....:	SW846 6850_DOD Ha		

0.47U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.47 J,B~~	4.6	ug/kg	0.24

~~4.6 U GBL~~ LM 05 12 11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

LM 04 21 11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI12-0211

HPLC

Lot-Sample #...: G1B050467-006 Work Order #...: MD4R41AE Matrix.....: SOLID
Date Sampled...: 02/04/11 09:06 Date Received..: 02/05/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 06:39
Dilution Factor: 1.02

Method.....: SW846 6850_DOD Ha

0.43U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.43 J,B~~	5.1	ug/kg	0.27

~~5.1 U GBL~~ WM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

WM 04/21/11

025

CH2M Hill Inc

Client Sample ID: VEECA-2SMI01-0211

HPLC

Lot-Sample #...: G1B050467-007 Work Order #...: MD4R91AE Matrix.....: SOLID
Date Sampled...: 02/04/11 10:00 Date Received..: 02/05/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 06:57
Dilution Factor: 1.03

Method.....: SW846 6850_DOD Ha

0.58U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.58 J,B~~	5.2	ug/kg	0.27

~~5.2 U GBL~~ WM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

WM 04/2/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI13-0211

HPLC

Lot-Sample #...: G1B050467-008 Work Order #...: MD4TA1AE Matrix.....: SOLID
Date Sampled...: 02/03/11 11:16 Date Received..: 02/05/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054373 Analysis Time..: 17:09
Dilution Factor: 0.97

Method.....: SW846 6850_DOD Ha

0.39 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.37 J,B~~	4.8	ug/kg	0.25

~~4.8 U GBL~~ UM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

UM 04/2/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI14-0211

HPLC

Lot-Sample #...: G1B050467-009 **Work Order #...:** MD4TC1AE **Matrix.....:** SOLID
Date Sampled...: 02/03/11 10:35 **Date Received..:** 02/05/11
Prep Date.....: 02/23/11 **Analysis Date..:** 02/25/11
Prep Batch #...: 1054373 **Analysis Time..:** 07:32
Dilution Factor: 1.02

Method.....: SW846 6850_DOD Ha

0.41 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.28 J,B~~	5.1	ug/kg	0.27

~~5.1 U GBL~~ UM 051211

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

UM 042111

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020411-SMI

Dissolved HPLC

Lot-Sample #...: G1B050467-002 **Work Order #...:** MD4R02A3 **Matrix.....:** WATER
Date Sampled...: 02/04/11 09:00 **Date Received..:** 02/05/11
Prep Date.....: 02/22/11 **Analysis Date..:** 02/22/11
Prep Batch #...: 1053108 **Analysis Time..:** 21:14
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 02/22/11

025

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020411-SMI

Dissolved HPLC

Lot-Sample #...: G1B050467-010 Work Order #...: MD4TD2AE Matrix.....: WATER
Date Sampled...: 02/04/11 11:35 Date Received..: 02/05/11
Prep Date.....: 02/22/11 Analysis Date..: 02/22/11
Prep Batch #...: 1053108 Analysis Time..: 21:32
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042111

036

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI15-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4RX
Matrix:	SOIL	**Lab Sample ID:**	G1B050467001
% Solids:	100.0	**Date/Time Collected:**	02/03/11 9:40
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	33900.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	27.5000		J MSL	P
7440-39-3	Barium	43.2000			P
7440-41-7	Beryllium	0.9700	J		P
7440-43-9	Cadmium	0.1500	J		P
7440-70-2	Calcium	26300.000			P
7440-47-3	Chromium	59.4000			P
7440-48-4	Cobalt	10.5000			P
7440-50-8	Copper	19.9000		J GBL	P
7439-89-6	Iron	38000.000			P
7439-92-1	Lead	15.0000			P
7439-95-4	Magnesium	7140.0000			P
7439-96-5	Manganese	838.0000			P
7440-02-0	Nickel	17.1000			P
7440-09-7	Potassium	7170.0000			P
7782-49-2	Selenium	0.5000	J ~~B~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	658.0000		J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	67.6000			P
7440-66-6	Zinc	41.9000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42211

031

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-020411-SMI
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R0
Matrix:	WATER	**Lab Sample ID:**	G1B050467002
% Solids:	0.0	**Date/Time Collected:**	02/04/11 9:00
Units:	UG/L	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	114.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/22/11

032

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI11T-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R1
Matrix:	SOIL	**Lab Sample ID:**	G1B050467003
% Solids:	100.0	**Date/Time Collected:**	02/03/11 13:20
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15500.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	14.6000		J ↓	P
7440-39-3	Barium	21.6000			P
7440-41-7	Beryllium	0.1600	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	155000.00			P
7440-47-3	Chromium	29.1000			P
7440-48-4	Cobalt	4.9000	J		P
7440-50-8	Copper	18.3000		J GBL	P
7439-89-6	Iron	19800.000			P
7439-92-1	Lead	1.3000	J		P
7439-95-4	Magnesium	5510.0000			P
7439-96-5	Manganese	371.0000			P
7440-02-0	Nickel	8.4000			P
7440-09-7	Potassium	2370.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	263.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	44.4000			P
7440-66-6	Zinc	27.9000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JLC 42211

U35

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI11-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R2
Matrix:	SOIL	**Lab Sample ID:**	G1B050467004
% Solids:	100.0	**Date/Time Collected:**	02/03/11 13:20
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16500.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	14.5000		J ↓	P
7440-39-3	Barium	22.5000			P
7440-41-7	Beryllium	0.1800	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	153000.00			P
7440-47-3	Chromium	31.3000			P
7440-48-4	Cobalt	5.1000			P
7440-50-8	Copper	20.9000		J GBL	P
7439-89-6	Iron	21100.000			P
7439-92-1	Lead	1.3000	J		P
7439-95-4	Magnesium	5800.0000			P
7439-96-5	Manganese	389.0000			P
7440-02-0	Nickel	9.1000			P
7440-09-7	Potassium	2530.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	272.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	47.3000			P
7440-66-6	Zinc	30.9000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

PC 42211

034

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI11TT-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R3
Matrix:	SOIL	**Lab Sample ID:**	G1B050467005
% Solids:	100.0	**Date/Time Collected:**	02/03/11 13:20
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16500.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	14.5000		J ↓	P
7440-39-3	Barium	22.1000			P
7440-41-7	Beryllium	0.2000	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	152000.00			P
7440-47-3	Chromium	31.3000			P
7440-48-4	Cobalt	5.1000			P
7440-50-8	Copper	19.4000		J GBL	P
7439-89-6	Iron	21300.000			P
7439-92-1	Lead	1.8000	J		P
7439-95-4	Magnesium	5800.0000			P
7439-96-5	Manganese	389.0000			P
7440-02-0	Nickel	8.9000			P
7440-09-7	Potassium	2540.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	268.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	48.1000			P
7440-66-6	Zinc	29.6000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI12-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R4
Matrix:	SOIL	**Lab Sample ID:**	G1B050467006
% Solids:	100.0	**Date/Time Collected:**	02/04/11 9:06
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	24400.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	13.9000		J ↓	P
7440-39-3	Barium	36.1000			P
7440-41-7	Beryllium	0.4700	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	77200.000			P
7440-47-3	Chromium	44.6000			P
7440-48-4	Cobalt	5.3000			P
7440-50-8	Copper	20.2000		J GBL	P
7439-89-6	Iron	24500.000			P
7439-92-1	Lead	5.6000			P
7439-95-4	Magnesium	11500.000			P
7439-96-5	Manganese	540.0000			P
7440-02-0	Nickel	12.3000			P
7440-09-7	Potassium	3820.0000			P
7782-49-2	Selenium	0.7900	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	287.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	46.1000			P
7440-66-6	Zinc	36.5000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/22/11

036

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SMI1-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4R9
Matrix:	SOIL	**Lab Sample ID:**	G1B050467007
% Solids:	100.0	**Date/Time Collected:**	02/04/11 10:00
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	6560.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	6.8000		J MSL	P
7440-39-3	Barium	14.7000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.1500	J		P
7440-70-2	Calcium	170000.00			P
7440-47-3	Chromium	14.5000			P
7440-48-4	Cobalt	2.0000	J		P
7440-50-8	Copper	8.8000		J GBL	P
7439-89-6	Iron	7650.0000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	6940.0000			P
7439-96-5	Manganese	219.0000			P
7440-02-0	Nickel	4.0000	J		P
7440-09-7	Potassium	1560.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	1970.0000			P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	16.2000			P
7440-66-6	Zinc	14.8000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

037

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI13-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4TA
Matrix:	SOIL	**Lab Sample ID:**	G1B050467008
% Solids:	100.0	**Date/Time Collected:**	02/03/11 11:16
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	24600.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	12.6000		J ↓	P
7440-39-3	Barium	43.3000			P
7440-41-7	Beryllium	0.5300	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	83400.000			P
7440-47-3	Chromium	43.0000			P
7440-48-4	Cobalt	6.2000			P
7440-50-8	Copper	21.4000		J GBL	P
7439-89-6	Iron	26300.000			P
7439-92-1	Lead	6.7000			P
7439-95-4	Magnesium	8930.0000			P
7439-96-5	Manganese	509.0000			P
7440-02-0	Nickel	12.7000			P
7440-09-7	Potassium	4840.0000			P
7782-49-2	Selenium	0.6400	J ~~B~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	396.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	44.6000			P
7440-66-6	Zinc	32.4000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JBC 4/22/11

036

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI14-0211
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4TC
Matrix:	SOIL	**Lab Sample ID:**	G1B050467009
% Solids:	100.0	**Date/Time Collected:**	02/03/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	20200.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	10.2000		J	P
7440-39-3	Barium	33.4000			P
7440-41-7	Beryllium	0.4100	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	77400.000			P
7440-47-3	Chromium	38.2000			P
7440-48-4	Cobalt	4.5000	J		P
7440-50-8	Copper	19.2000		J GBL	P
7439-89-6	Iron	20000.000			P
7439-92-1	Lead	5.3000			P
7439-95-4	Magnesium	13200.000			P
7439-96-5	Manganese	473.0000			P
7440-02-0	Nickel	11.8000			P
7440-09-7	Potassium	3180.0000			P
7782-49-2	Selenium	0.8100	J ~~B~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	387.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	39.0000			P
7440-66-6	Zinc	31.1000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB02-020411-SMI
Lot Number:	G1B050467	**Lab WorkOrder:**	MD4TD
Matrix:	WATER	**Lab Sample ID:**	G1B050467010
% Solids:	0.0	**Date/Time Collected:**	02/04/11 11:35
Units:	UG/L	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	116.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/22/11

U40

CH2M Hill Inc

Client Sample ID: VERCA-4SMI15-0211

General Chemistry

Lot-Sample #...: G1B050467-001 Work Order #...: MD4RX Matrix.....: SOLID
Date Sampled...: 02/03/11 09:40 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
	Dilution Factor: 1			Analysis Time..: 15:06	DL.....: 0.10	
Hexavalent Chromium	0.025 ~~0.017 J4~~ GBL	0.050	mg/kg	SW846 7196A	02/17/11	1054266
	Dilution Factor: 1			Analysis Time..: 16:39	DL.....: 0.010	

NOTE(S):

RL Reporting Limit

J Estimated result. Result is less than RL.

JAC 4-22-11

041

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020411-SMI

General Chemistry

Lot-Sample #...: G1B050467-002 **Work Order #...:** MD4R0 **Matrix.....:** WATER
Date Sampled...: 02/04/11 09:00 **Date Received..:** 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	~~5.0 U~~ R HT	10.0	ug/L	SW846 7196A	02/07/11	1040338

Dilution Factor: 1 Analysis Time..: 12:17 DL.....: 2.0

JAC 4/2/11

042

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11T-0211

General Chemistry

Lot-Sample #...: G1B050467-003 Work Order #...: MD4R1 Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:40 DL.....: 0.010

JAC 4/22/11

045

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11-0211

General Chemistry

Lot-Sample #...: G1B050467-004 **Work Order #...:** MD4R2 **Matrix.....:** SOLID
Date Sampled...: 02/03/11 13:20 **Date Received..:** 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:10	DL.....: 0.10	
Hexavalent Chromium	0.12 U ~~G~~	0.25	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 5		Analysis Time..: 16:43	DL.....: 0.050	

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/22/11

044

CH2M Hill Inc

Client Sample ID: VEECA-4SMI11TT-0211

General Chemistry

Lot-Sample #...: G1B050467-005 **Work Order #...:** MD4R3 **Matrix.....:** SOLID
Date Sampled...: 02/03/11 13:20 **Date Received..:** 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:43 DL.....: 0.010

JBC
42211

045

CH2M Hill Inc

Client Sample ID: VKECA-4SMI12-0211

General Chemistry

Lot-Sample #...: G1B050467-006 Work Order #...: MD4R4 Matrix.....: SOLID
Date Sampled...: 02/04/11 09:06 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:15	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 1		Analysis Time..: 16:44	DL.....: 0.010	

JBC
42211

046

CH2M Hill Inc

Client Sample ID: VEECA-2SMI01-0211

General Chemistry

Lot-Sample #...: G1B050467-007 Work Order #...: MD4R9 Matrix.....: SOLID
Date Sampled...: 02/04/11 10:00 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.7	0.10	--	SW846 9045C	02/28/11	1057087
	Dilution Factor: 1			Analysis Time..: 15:19	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266
	Dilution Factor: 1			Analysis Time..: 16:44	DL.....: 0.010	

JLC
4/2/11

047

CH2M Hill Inc

Client Sample ID: VERCA-4SMI13-0211

General Chemistry

Lot-Sample #...: G1B050467-008 Work Order #...: MD4TA Matrix.....: SOLID
Date Sampled...: 02/03/11 11:16 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:23	DL.....: 0.10	
Hexavalent Chromium	0.025 ~~0.011 J~~ U GBL	0.050	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 1		Analysis Time..: 16:45	DL.....: 0.010	

NOTE(S):

RL Reporting Limit

J Estimated result. Result is less than RL.

JLC 4/22/11

048

CH2M Hill Inc

Client Sample ID: VEECA-4SMI14-0211

General Chemistry

Lot-Sample #...: G1B050467-009 Work Order #...: MD4TC Matrix.....: SOLID
Date Sampled...: 02/03/11 10:35 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.6	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:27	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266
		Dilution Factor: 1		Analysis Time..: 16:45	DL.....: 0.010	

JAC 4/22/11

045

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020411-SMI

General Chemistry

Lot-Sample #...: G1B050467-010 **Work Order #...:** MD4TD **Matrix.....:** WATER
Date Sampled...: 02/04/11 11:35 **Date Received..:** 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	~~5.0 U~~ R HT	10.0	ug/L	SW846 7196A	02/07/11	1040338

Dilution Factor: 1 Analysis Time..: 12:17 DL.....: 2.0

JLC 42211

056

Case Narrative

TestAmerica West Sacramento Project Number G1B050467

General Comments

Samples on chain of custody (COC) 124995 were received at 1 degree Celsius (C), with the temperature blank at 0 degrees Celsius. Samples on COC 600097 were at 1 degree Celsius, with the temperature blank at -1 degrees C. Wet ice was used as a cooling agent.

*The laboratory received sample containers for sample EB02 but this sample was not listed on COC. The client was consulted and instructed the laboratory to login this sample as VEECA-EB02-020411-SMI for analysis of Perchlorate via 6850, Explosives via 8330B, Metals via 6010B/6020 and Hexavalent Chromium via 7196A.

There were no analyses marked for the samples on COC #008001. The client was consulted and instructed the laboratory to analyze these samples for Perchlorate via 6850, Explosives via 8330B, Metals via 6010B/6020, Hexavalent Chromium via 7196A and pH via 9045.

Analysis of pH via 9045 was cancelled by the client on February 7, 2011 for samples VEECA-4SMI11T-0211, VEECA-$SMI11TT-0211, VEECA-4SMI02T-0211 and VEECA-4SMI02TT-0211.

The client instructed the laboratory to change the client ID for sample VEECA-2SMI1-0211 to VEECA-2SMI01-0211.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Samples for analysis of all methods were processed by multi-incremental sampling techniques (MIS) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

051

Case Narrative

TestAmerica West Sacramento Project Number G1B050467

General Comments (continued)
The data for the laboratory duplicate and triplicate are reported as samples 12 and 13 for the metals and hexavalent chromium. The native sample is 3, client ID VEECA-4SMI11T-0211. The data for the laboratory duplicate and triplicate are reported as samples 14 and 15 for explosives via 8330B. The native sample is 1, client ID VEECA-4SMI15-0211. The data for the laboratory duplicate and triplicate are reported as samples 16 and 17 for perchlorate via 6850. The native sample is 9, client ID VEECA-4SMI14-0211. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of each summary section.

SOLID, 8330B, Nitroaromatics & Nitramines
Samples: 1, 3, 4, 5, 6, 7, 8, 9
The certified reference material (CRM) associated with this extraction batch and reported as work order MEGK81AE has a low recovery, outside the established control limits for Nitrobenzene and 3-Nitrotoluene. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control.

The grinding blank associated with these samples has been reported as a method blank with work order MEGK81AD.

The MSD sample required manual integration for several compounds. Detailed information can be found in the Manual Integration Addendum section of this report.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 1, 3, 4, 5, 6, 7, 8, 9
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MERHT1AC
SMCS: MERHT1AE

The grinding blank associated with these samples and reported under work order MERHT1AD had a detection for perchlorate at a level between the Limit of Quanitation (LOQ) of 5.0 ug/Kg and the Detection Limit (DL) of 0.26 ug/Kg. This grinding blank is from the MIS process. The method blank is non-detect for perchlorate. Samples having positive detections for perchlorate are flagged with a B, denoting the target analyte is present at a reportable level in the associated grinding blank.

052

Case Narrative

TestAmerica West Sacramento Project Number G1B050467

SOLID, 6850/DOD Handbook, Perchlorate (continued)
Samples: 1, 3, 4, 5, 6, 7, 8, 9
Certified Reference Material (CRM) was not immediately available for the multi-incremental sampling (MIS) as requested for 6850 (perchlorate) analysis.
A 200 gram aliquot of Ottawa Sand was fortified with 10ug of Perchlorate (5.0 ug/Kg), mixed well, air dried and ground via puck mill. It was then sampled as per the MIS procedure. A 3 gram portion was extracted in a batch for method 6850. The results are as follows:

Description	Result (ug/Kg)	Comment
Method Blank	ND	RL 5.0 ug/Kg
LCS	4.7	94% Recovery (Limit 80-120%)
Puck Mill Blank	ND	RL 5.0 ug/Kg
Puck Mill LCS	4.2	83% Recovery (Limit 80-120%)

The Puck Mill Blank and Puck Mill LCS are the MIS processed samples and the results demonstrate the MIS process is in control. Please see supporting data in the Appendix section.

Samples: 1, 8, 9
The noted samples required manual integration for perchlorate. Detailed information can be found in the Manual Integration Addendum section of this report.

WATER, 8330B, Nitroaromatics & Nitramines
Samples: 2, 10
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

WATER, 6850/DOD Handbook, Perchlorate
Samples: 2, 10
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MEFQN1AC
SMCS: MEFQN1AD

053

Case Narrative

TestAmerica West Sacramento Project Number G1B050467

SOLID, 6010B, Metals
Samples: 1, 3, 4, 5, 6, 7, 8, 9, 12, 13
The recoveries for the analytes Aluminum, Antimony, Calcium, Chromium, Iron, Manganese, and Potassium are outside the established control limits for the MS and/or MSD associated with this batch. The concentrations of Aluminum, Calcium, Chromium, Iron and Manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

Due to the increased sample size and inherent matrix the samples were initially run at 10x and undiluted. The instrument shutdown when it encountered the first undiluted sample. After analyzing the 10x data, it was determined that all samples required reanalysis at 5x dilutions. All of the data was reported from the 5x dilution.

An aqueous grinding blank was created by rinsing the mortar and pestal before each use and compositing the rinsate. The data has been reported as sample -11. Calcium was detected at a reportable level. There were also detections between the LOQ and DL for Copper, Potassium, Magnesium, Manganese, Sodium and Zinc.

SOILD, 6020, Metals
Samples: 1, 3, 4, 5, 6, 7, 8, 9, 12, 13
The recovery for Arsenic is outside the established control limits for the MS/MSD associated with this batch. Acceptable LCS data demonstrate that the analytical system is in control.

SOLID, 7196A, Hexavalent Chromium
Samples: 1, 3, 4, 5, 6, 7, 8, 9, 12, 13
An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -11. There was a detection of 2.1 ug/L, between the LOQ of 10 ug/L and DL of 2.0 ug/L or Hexavalent Chromium.

WATER, 7196A, Hexavalent Chromium
Sample: 2
The samples were received at the laboratory after the recommended 24 hour holding time for the test had expired. The samples were analyzed after consultation with the client.
Sampling date: 2/4/11 @ 9:00 am
Received date: 2/5/11 @ 9:10 am
Hold time expiration date: 2/5/11 @ 9:00 am
Analysis Date: 2/7/11

054

Case Narrative

TestAmerica West Sacramento Project Number G1B050467

WATER, 7196A, Hexavalent Chromium (Continued)

Sample: 10

The noted sample was analyzed after the recommended 24 hour holding time had expired. Samples arrived on a Saturday, when no analyst trained in this analysis was available.

Sampling date: 2/4/11 @ 11:35 am
Received date: 2/5/11 @ 9:10 am
Hold time expiration date: 2/5/11 @ 11:35 am
Analysis date: 2/7/11

There were no other anomalies associated with this project.

055

Sample Summary

TestAmerica West Sacramento Project Number G1B050467

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MD4RX	1	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MD4R0	2	VEECA-EB01-020411-SMI	2/4/2011 09:00 AM	2/5/2011 09:10 AM
MD4R1	3	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R2	4	VEECA-4SMI11-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R3	5	VEECA-4SMI11TT-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R4	6	VEECA-4SMI12-0211	2/4/2011 09:06 AM	2/5/2011 09:10 AM
MD4R9	7	VEECA-2SMI1-0211	2/4/2011 10:00 AM	2/5/2011 09:10 AM
MD4TA	8	VEECA-4SMI13-0211	2/3/2011 11:16 AM	2/5/2011 09:10 AM
MD4TC	9	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM
MD4TD	10	VEECA-EB02-020411-SMI	2/4/2011 11:35 AM	2/5/2011 09:10 AM
MEQ17	11	Grinding Blank #1	2/4/2011 11:35 AM	2/5/2011 09:10 AM
MEW9L	12	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MEW9M	13	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MEW9N	14	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MEW9P	15	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MEW9Q	16	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM
MEW9R	17	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM

Notes:

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

056

G1B050467

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

G1B050467

TAL-4124 (1007)

Client: CH2M Hill	Project Manager: John Swenforth	Date: 2/4/11	Chain of Custody Number: 124995
Address: Camp Garcia Building 4585	Telephone Number (Area Code)/Fax Number: 813-281-7762	Lab Number:	Page 1 of 1
City: Vieques; State: PR; Zip Code: 00765	Site Contact: 757-285-7685	Lab Contact: 703-376-5301	
Project Name and Location (State): ECA RI Vieques	Carrier/Waybill Number: Fedex		
Contract/Purchase Order/Quote No.: 408040.FI.FK.EC			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Explosives 8330	Metals (Total)	Total Hg	Special Instructions/ Conditions of Receipt
1 VEECA-45MI15-0211	2/3/11	0940				X	1						1	1	1	
2 VEECA EB01-020411-45MI	02/04/11	0900		X			4		1					2	1	1
3 VEECA 45MI11T-0211	02/03/11	1320				X	3						1	1		per V. Weber cancel analysis of 9045C (pH)
4 VEECA 45MI11-0211	02/03/11	1320					3						1	1		
5 VEECA 45MI11TT-0211	02/03/11	1320					3						1	1		per V. Weber cancel analysis of 9045C (pH)

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify):

1. Relinquished By: Stephen Brand	Date: 2/4/11	Time: 1200	1. Received By:	Date: 2-5-11	Time: 1045
2. Relinquished By:	Date:	Time:	2. Received By:	Date:	Time:
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments:

TestAmerica West Sacramento (916) 373 - 5600

G1B050467

G1B050467 № 008001

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Page 1 of 1

Courier: Fedex
Airbill No.: 8716 9323 2775
Sampling Complete? Y or N

Company Name: CH2M Hill
Address: Camp Garcia Building 4525
City: Vieques State: PR Zip: 00765
Project Contact: Victoria Brynildsen
Phone #: ~~703-376-5301~~ 757-677-6252
Sampler's Name: Renji Butler

Project Name: FCA-RI Vieques
Sampling Location: Vieques PR
Turnaround time: Standard 28 day
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)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	EXPLO 8330 Blast and Perch	Metals, ECR-RES, Items Hexcr	Woem pH
6	VEECA-4SMT12-0211	2/4/11	0906	SMT	3									
7	VEECA-2SMT1-0211	2/4/11	1000	SMT	3									

Lab Use Only

Sample Unpacked By:
Sample Order Entry By:
Samples Received in Good Condition? Y or N
If no, explain:
Cyanide samples checked for sulfide & chlorine? Y or NA
625 & Phenol samples checked for chlorine? Y or NA
608 samples checked for pH between 5.0-9.0? Y or NA

Comments

Sample Custody

Relinquished by: Stephen Brand Date/Time: 2/4/11 1200 Received by: [illegible] Date/Time: 2-5-11 1045
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: — °C

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

White & Yellow copy to lab • Pink copy for customer

Sacramento (916) 373-5600

056

G1B050467

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

G1B050467 3

TAL-4124 (1007)

Client: CH2M Hill	Project Manager: John Swenfurth	Date: 2/4/11	Chain of Custody Number: 124996
Address: Camp Garcia Building 4525	Telephone Number (Area Code)/Fax Number: 813-281-7762	Lab Number	Page 1 of 1
City: Vieques; State: PR; Zip Code: 00765	Site Contact: 757-285-7685	Lab Contact: 703-376-5301	
Project Name and Location (State): ECARI Vieques	Carrier/Waybill Number: Fedex 871693232775		
Contract/Purchase Order/Quote No.: 408040.FI.FK.EC			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	ERPS 8260 VOC	ERPS 4.4'-DDT	ERPS 8270 SVOC	Special Instructions/ Conditions of Receipt
VEECA-45MI13-0211	2/3/11	1116				X	3						1	3	1	
VEECA-45MI14-0211	2/3/11	1035				X	4						1	4	1	
VEECA-45MI15-0211	2/3/11	0940				X	3						1	3	1	

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By: Stephen Burand	Date: 2/4/11	Time: 1200	1. Received By: [illegible]	Date: 2-5-11	Time: 1045
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Incl VEECA-EB02-020411 @ 1135

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

2-5-11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M HILL PM KS LOG # 69256

LOT# (QUANTIMS ID) G1B050467 QUOTE# 08113 LOCATION W8C

Checked (✓)

DATE RECEIVED 2-5-11 TIME RECEIVED 910 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) 124996 ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____ See temp. sheet

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials: OH Date: 2-5-11

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☑ N/A ☑

☑ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ~~☑ N/A~~ ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: OH Date: 2-5-11

Notes HTV EB01 + FB02

FB02 not listed on COC

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2MHILL LOT# (QUANTIMS ID): G1B050467

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600095 ☑

COC #(S) 124996 ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 1 2 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ # 5 ☐ ☐ OTHER ☑

==========

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600093 ☑

COC #(S) 124995 ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 1 2 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

==========

COOLER ID 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600097 ☑

COC #(S) 005001

TEMPERATURE BLANK: OBSERVED: -1 CORRECTED -1 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

Initials: AK Date: 2-5-11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B050467

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB		2								2										
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ	4		3	3	3	3	3	3	4											
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn		1								1										
500PJna																				
500PJzn/na																				
250PJ		2								2										
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B050467

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X			✓								X										
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

MEMORANDUM **CH2MHILL**

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: February 7, 2011

This memo is to document corrections made to entries on the Chains of Custody (COC) for Vieques ECA CTO – 037.

The following analyses need to be cancelled for the samples listed:

G1B050467-3	VEECA-4SMI11T-0211	pH 9045C	2/3/11	13:20
G1B050467-5	VEECA-4SMI11TT-0211	pH 9045C	2/3/11	13:20
G1B040475-3	VEECA-4SMI02T-0211	pH 9045C	2/2/11	11:00
G1B040475-5	VEECA-4SMI02TT-0211	pH 9045C	2/2/11	11:00

Please correct the following Sample ID:

1	VEECA-2SMI01-0211	VEECA-2SMI1-0211	2/4/11	10:00

COPYRIGHT 2011 BY CH2M HILL, INC. - COMPANY CONFIDENTIAL

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: February 8, 2011

This memo is to document corrections made to entries on or left off of the Chains of Custody (COC) for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

VEECA-4SMI12-0211	pH 9045C, 8330B, 6850, 6010B, 6020, 7169A	2/4/11	09:06
VEECA-2SMI01-0211	pH 9045C, 8330B, 6850, 6010B, 6020, 7169A	2/4/11	10:00

*Please note previous corrections memo for Sample ID correction for VEECA-2SMI01-0211

Please add the following Sample, left off the COC and update the Sample ID:

VEECA-EB02-020411-SMI	VEECA-EB02-020411	6850, 8330B, 6010B, 6020, 7196A	2/4/11	11:35

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B050461

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

8.0 Holding Times

Sampled 2/3-4/11 Prep 2/8-16/11
Recd 2/5/11 Analy 2/19-24/11

8.1 Have any nitroaromatics and nitroamines technical

Temp 1-2°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ✓ CRM

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓ LCS ✓ CRM

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

CLM

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: G1B050467 Work Order #...: MEGK81AE Matrix.....: SOLID
LCS Lot-Sample#: G1B160000-106
Prep Date.....: 02/16/11 Analysis Date..: 02/23/11
Prep Batch #...: 1047106 Analysis Time..: 15:33
Dilution Factor: 0.99

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,3,5-Trinitrobenzene	100	(58 - 116)	SW846 8330B
1,3-Dinitrobenzene	95	(69 - 116)	SW846 8330B
2,4,6-Trinitrotoluene	94	(69 - 120)	SW846 8330B
2,4-Dinitrotoluene	96	(69 - 137)	SW846 8330B
2,6-Dinitrotoluene	86	(60 - 121)	SW846 8330B
2-Amino-4,6-dinitrotoluene	87	(56 - 108)	SW846 8330B
2-Nitrotoluene	73	(67 - 117)	SW846 8330B
3-Nitrotoluene	64 a	(69 - 124)	SW846 8330B
4-Amino-2,6-dinitrotoluene	78	(46 - 98)	SW846 8330B
4-Nitrotoluene	71	(63 - 123)	SW846 8330B
HMX	96	(59 - 131)	SW846 8330B
Nitrobenzene	56 a	(58 - 119)	SW846 8330B
Nitroglycerin	90	(60 - 115)	SW846 8330B
PETN	88	(60 - 115)	SW846 8330B
RDX	97	(62 - 123)	SW846 8330B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	103	(81 - 127)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

074

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
___out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? [✓] ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? [✓] ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? [✓] ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ [✓] ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ [✓] ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-020411-SMI MO ⊕

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ✓ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C-18

column 2: Synergi Hydro-RP C-18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ✓ ___ ___

b. All blanks ✓ ___ ___

c. Matrix spike samples ✓ ___ ___

d. 5 pt. initial calibration standards ✓ ___ ___

e. Calibration verification standards ✓ ___ ___

f. Laboratory Control samples (LCS) ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ✓ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ☑ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ✓ ___

not provided only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ☑ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ☑ ___ ___

w/in 1 min

086

YES NO N/A

ACTION i:If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked CCal in sequence and compared RT and check stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) [ ] ✓ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Man log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? [✓] ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

W/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] [✓] ___

Checked by data validator - in

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ ✓ ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? ✓ ___ ___

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ ✓ ___

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? ___ ✓ ___

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B050467 1
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 2/23/2011 Analysis Date (2): 2/24/2011

CMPNAM	Result(Col1)	Result(Col2)	%D	Q
1,3,5-Trinitrobenzene	ND	NA	NA	
1,3-Dinitrobenzene	ND	NA	NA	
2,4,6-Trinitrotoluene	ND	NA	NA	
2,4-Dinitrotoluene	ND	NA	NA	
2,6-Dinitrotoluene	ND	NA	NA	
2-Amino-4,6-dinitrotoluene	ND	NA	NA	
3,5-Dinitroaniline	12.56	24.85	66%	PG
4-Amino-2,6-dinitrotoluene	ND	NA	NA	
RDX	ND	NA	NA	
TETRYL	ND	NA	NA	
m-Nitrotoluene	ND	NA	NA	
Nitrobenzene	ND	NA	NA	
Nitroglycerin	ND	NA	NA	
HMX	ND	NA	NA	
o-Nitrotoluene	ND	NA	NA	
PETN	ND	NA	NA	
p-Nitrotoluene	ND	NA	NA	

J

~~17.06~~ ug/L
13.16
CCal 13.10
13.08

~~39.14~~ ug/L
32.43
CCal 32.05
31.99

Sample Summary

TestAmerica West Sacramento Project Number G1B050467

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MD4RX	1	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MD4R0	2	VEECA-EB01-020411-SMI	2/4/2011 09:00 AM	2/5/2011 09:10 AM
MD4R1	3	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R2	4	VEECA-4SMI11-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R3	5	VEECA-4SMI11TT-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MD4R4	6	VEECA-4SMI12-0211	2/4/2011 09:06 AM	2/5/2011 09:10 AM
MD4R9	7	VEECA-2SMI1-0211	2/4/2011 10:00 AM	2/5/2011 09:10 AM
MD4TA	8	VEECA-4SMI13-0211	2/3/2011 11:16 AM	2/5/2011 09:10 AM
MD4TC	9	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM
MD4TD	10	VEECA-EB02-020411-SMI	2/4/2011 11:35 AM	2/5/2011 09:10 AM
MEQ17	11	Grinding Blank #1	2/4/2011 11:35 AM	2/5/2011 09:10 AM
MEW9L	12	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MEW9M	13	VEECA-4SMI11T-0211	2/3/2011 01:20 PM	2/5/2011 09:10 AM
MEW9N	14	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MEW9P	15	VEECA-4SMI15-0211	2/3/2011 09:40 AM	2/5/2011 09:10 AM
MEW9Q	16	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM
MEW9R	17	VEECA-4SMI14-0211	2/3/2011 10:35 AM	2/5/2011 09:10 AM

Notes:

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ [✓] ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? [✓] ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate → VEECA-45MI11-0211 no ⊕

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 5:47 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI
Attachments: 8330 Form X.PDF; 8330 Form X.XLS; Cross Reference Summaries.pdf

Hi Laura,
Attached are The other forms you requested. We're providing both an excel summary and pdfs of the summary. I wasn't sure which would be easier for you to use. I've also provided a cross-reference summary as we're only showing the lab IDs on the forms. Please let me know if you need anything else.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

096

I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:45	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22	For all lots analyzed on LC10.							
23								
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
METHOD ID: 8330
COLUMN PHASE: Zorbax CN
DIMENSIONS: 250 x 4.6mm 5u
COLUMN SN: USJT010289
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/3-4/11
Received Date: 2/5/11
Prep Date: 2/22-23/11
Analysis Dates: 2/22-25/11
Cooler Temp: 1-2°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

Contamination was noted in one of the method and/or grinding blanks - qualifications required. Associated QC blanks were: VEECA-EB01-020311-SMI and VEECA-EB01-020411-SMI (no positive results exhibited).

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Reporting Limit
Grinding Blank: G1B230000-373 extraction 2/23/10	perchlorate	0.36J ug/kg	5.0 ug/kg
VEECA-EB01-020311-SMI	perchlorate	0.59 ug/L	0.25 ug/L

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

Sample ID	Compound	Q Flag	Qual Code
VEECA-4SMI15-0211, VEECA-4SMI11T-0211, VEECA-4SMI11-0211, VEECA-4SMI11TT-0211, VEECA-4SMI12-0211, VEECA-2SMI01-0211, VEECA-4SMI13-0211, VEECA-4SMI14-0211	perchlorate	report RL with U	GBL

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for sample VEECA-4SMI14-0211-all criteria was met.

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was submitted for sample VEECA-4SMI11T-0211—no positive results, no qualifications.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer Laura Mascuilo **Date:** 4,21,11

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓ not CLP
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]		
Legible?	[✓]		
Signature of sample custodian present?	[✓]		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[___]	___	✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B050467

ICP - AES	
SAMPLE ID	VEECA-4SMI15-0211
ANALYTE	manganese
Lab Value CONCENTRATION (mg/Kg)	838
AMOUNT FROM RAW DATA (ug/ml)	3.3137
SAMPLE SIZE (g)	0.988
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	838.487

ICP-MS	
SAMPLE ID	VEECA-4SMI13-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	12.6
AMOUNT FROM RAW DATA (ug/L)	50.076538
SAMPLE SIZE (g)	0.992
FINAL VOLUME (L)	0.05
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	12.62010

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments? Values present - not validated	✓		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?		✓	
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?		[ ]	✓
	Mercury analysis(28 days) exceeded?		[ ]	✓
	Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

		YES	NO	N/A
A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	[✓]		
	Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]		

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]		
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]		
Are results on Form I'S reported by correct significant figures?	[✓]		
Are soil sample results on Form I's corrected for percent solids? all were 100% solids	[ ]		✓
Are all "less than MDL" values reported by the ~~CRQLs~~ LOD's and coded with "U"?	[✓]		
Are values less than the ~~CRQLs~~ LOD's but greater than or equal to the MDLs flagged with "J"?	[✓]		
Are appropriate contractual quality control and Method qualifiers used?	[✓]		

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓]

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Some dilutions ~~weren't~~ were required & performed as necessary. This information wasn't included on Form I's

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[ ]		✓
	Cyanide Analysis?	[ ]		✓
	ICP-AES(more than 2 point Calib.)?	[ ]		✓
	ICP-MS (more than 2 point calib.)?	[✓]		

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]		
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[ ]		✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]		

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[ ]		✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

JAC 42511

Are ICV/CCVs within control limits for:

no quals were required - no field samples assoc.

Metals - 90-110%R?	[✓]	✓	
Hg - 80-120%R?	[ ]		✓
Cyanide - 85-115%R?	[ ]		✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [ ] ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110226A1

Analyte	True Conc.	02/26/11 16:01 CCV 4 Found %REC		02/26/11 16:07 CCV 5 Found %REC		02/26/11 16:33 CCV 6 Found %REC	
Arsenic	100	107.00	107.0	99.72	99.7	99.19	99.2
Selenium	100	113.25	113.3	99.31	99.3	97.51	97.5
Thallium	50	48.66	97.3	49.95	99.9	49.41	98.8

no samples associated

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110226A1

Analyte	True Conc.	02/26/11 16:39 CCV 7 Found %REC		02/26/11 17:06 CCV 8 Found %REC		02/26/11 17:12 CCV 9 Found %REC	
Arsenic	100	99.45	99.4	98.95	98.9	98.53	98.5
Selenium	100	97.87	97.9	99.99	100.0	97.13	97.1
Thallium	50	49.99	100.0	49.30	98.6	49.69	99.4

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228B1

Analyte	True Conc.	02/28/11 09:50 ICV Found %REC	02/28/11 16:17 ICV Found %REC	02/28/11 16:27 ICV REPOUR Found %REC
Arsenic	80	83.65 104.6	78.41 98.0	77.30 96.6
Selenium	80	82.46 103.1	81.70 102.1	77.79 97.2
Thallium	40		44.54 111.3	43.84 109.6

No Samples assoc. std. was run.

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228A1A

Analyte	True Conc.	02/28/11 10:22 CCV 1 Found %REC	02/28/11 10:30 CCV 2 Found %REC	02/28/11 11:12 CCV 3 Found %REC
Arsenic	100	100.06 100.1	99.90 99.9	100.25 100.2
Selenium	100	99.32 99.3	98.76 98.8	100.14 100.1

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B050467 Instrument Id: T01

Units: ug/L Datafile Name: 022411

Analyte	True Conc.	02/24/11 15:43 ICV4 Found	%REC
Aluminum	10000	9849.9	98.5
	10000	9676.9	96.8
Antimony	250	249.25	99.7
Barium	1000	1004.9	100.5
Beryllium	250	245.43	98.2
Cadmium	250	253.90	101.6
	250	253.20	101.3
Calcium	10000	10399	104.0
Chromium	1000	1003.0	100.3
Cobalt	1000	1019.1	101.9
Copper	1000	977.75	97.8
Iron	10000	10762	107.6
	10000	10656	106.6
Lead	250	262.14	104.9
Magnesium	10000	9830.3	98.3
Manganese	1000	1036.7	103.7
Nickel	1000	1028.0	102.8
Potassium	10000	10037	100.4
Silver	250	243.33	97.3
Sodium	10000	11624	116.2
Vanadium	1000	979.17	97.9
Zinc	1000	997.29	99.7

assoc. sample is qualifying blank
no qualifs were required.

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B050467

Units: ug/L

Instrument Id: T01

Datafile Name: 022511

Analyte	True Conc.	02/25/11 15:20 ICV4 Found	%REC
Aluminum	10000	9877.9	98.8
	10000	9809.6	98.1
Antimony	250	248.84	99.5
Barium	1000	1009.9	101.0
Beryllium	250	248.10	99.2
Cadmium	250	253.70	101.5
	250	252.10	100.8
Calcium	10000	10417	104.2
Chromium	1000	1002.0	100.2
Cobalt	1000	1016.4	101.6
Copper	1000	975.37	97.5
Iron	10000	10755	107.6
	10000	10739	107.4
Lead	250	258.76	103.5
Magnesium	10000	9824.5	98.2
Manganese	1000	1037.1	103.7
Nickel	1000	1039.5	104.0
Potassium	10000	10060	100.6
Silver	250	243.11	97.2
Sodium	10000	11638	116.4
Vanadium	1000	980.18	98.0
Zinc	1000	1009.5	101.0

No field samples associated.

Form 2 ICV/CCV Equivalent

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

analyzed at frequency required by method / SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:23 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B100574_LLQS.pdf; G1B050467_LLQS.pdf; G1B090534_LLQS.pdf; G1B230488_LLQS.pdf; G1B100573_LLQS.pdf

Jackie,
And here are the last 5 files of supplemental raw data for this issue.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? un assoc stds.	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

no qualifications required as no samples were associated

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

Note - Grinding blank treated as preps blank - see Form I for required flags, if any.

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228A1A

Analyte	02/28/11 09:53 ICB	02/28/11 16:20 ICB	02/28/11 16:38 ICB
Arsenic	3.0 U	3.0 U	3.0 U
Selenium	3.0 U	3.0 U	3.0 U
Thallium		1.5 U	1.5 U

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228A1A

Analyte	02/28/11 10:26 CCB 1	02/28/11 10:33 CCB 2	02/28/11 11:15 CCB 3
Arsenic	3.0 U	3.0 U	3.0 U
Selenium	3.0 U	3.0 U	3.0 U

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228A1A

Analyte	02/28/11 11:22 CCB 4	02/28/11 11:53 CCB 5	02/28/11 12:04 CCB 6
Arsenic	3.0 U	3.0 U	3.0 U
Selenium	3.0 U	3	3.0 U

(no samples assoc. no quals required)

Lot Number: G1B050467 Instrument Id: M01

Units: ug/L Datafile Name: 110228A1A

Analyte	02/28/11 12:31 CCB 7	02/28/11 12:39 CCB 8	02/28/11 13:03 CCB 9
Arsenic	3.0 U	3.0 U	3.0 U
Selenium	3.0 U	3.0 U	3.0 U

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ___ [✓] ___

ACTION:
If yes, change sample result ≥ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

See following page for flags based on qunding blank

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[___]	✓

ACTION:

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	Grinding Blank #1
Lot Number:	G1B050467	**Lab WorkOrder:**	MEQ17
Matrix:	WATER	**Lab Sample ID:**	G1B050467011
% Solids:	0.0	**Date/Time Collected:**	02/04/11 11:35
Units:	UG/L	**Date/Time Received:**	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	1320.0000			P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	11.6000	J		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	189.0000	J		P
7439-96-5	Manganese	3.5000	J		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	254.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	779.0000	J		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	5.8000	J		P

No Quals (660 mg/kg)

J all + Cu ≤ 29 mg/kg

No Quals (472.5)

No Quals (2.75 ~~635~~ mg/kg)

No Quals (635 mg/kg)

J all + Na except 25 MI1

NQuals (14.5 mg/kg)

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Nicarr JAC 42211

121

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

122

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:**
For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value? [___] ✓ ___ ___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

110228B1 2/28/11 ~~1713~~ 1640 JAC 425 11
Se -4.97 (LOQ - 3.0)
No Quals - Acceptable
ICSA run prior to samples

CH2M Hill Inc

Interference Check Standard A

Instrument Id: M01

Lot Number: G1B050467

Datafile Name: 110228A1A

Units: ug/L

Analyte	Spike Amount	ICSA 02/28/11 10:06 Found	ICSA 02/28/11 16:40 Found
Arsenic	0	0.61	1.01
Selenium	0	1.40	-4.97
Thallium	0		0.13

NQ see 1713 ICSA run

Instrument Id: M01

Lot Number: G1B050467

Datafile Name: 110228B1

Units: ug/L

Analyte	Spike Amount	ICSA 02/28/11 17:13 Found
Arsenic	0	0.67
Selenium	0	0.72
Thallium	0	0.12

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.	see following Form 5's		
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI15-0211
Lot Number:	G1B050467	**MS Lab Workorder:**	MD4RX - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001S
% Solids	100.0	**QC Batch ID:**	1055314
Units:	MG/KG	**Instrument ID:**	M01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Arsenic	80 - 120	34.2000	N	27.5000		10.2000	65.0	N	P
Selenium	80 - 120	9.4200		0.5000	B	10.2000	87.0		P
Thallium	80 - 120	2.5100		0.5000		2.5500	92.0		P

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI15-0211
Lot Number:	G1B050467	**MS Lab Workorder:**	MD4RX - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001D
% Solids	100.0	**QC Batch ID:**	1055314
Units:	MG/KG	**Instrument ID:**	M01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Arsenic	80 - 120	34.5000	N	27.5000		10.1000	69.0	N	P
Selenium	80 - 120	9.0100		0.5000	B	10.1000	84.0		P
Thallium	80 - 120	2.4200		0.5000		2.5400	90.0		P

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI15-0211
Lot Number:	G1B050467	**MS Lab Workorder:**	MD4RX - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001S
% Solids	100.0	**QC Batch ID:**	1055301
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	40600.0000	N	33900.0000		101.0000	6700.0	N	P	* NQ
Antimony	80 - 120	10.3000	N	10.0000		25.2000	37.0	N	P	J/UJ
Barium	80 - 120	136.0000		43.2000		101.0000	92.0		P	
Beryllium	80 - 120	3.2800		0.9700		2.5200	91.0		P	
Cadmium	80 - 120	2.2700		0.1500	J	2.5200	84.0		P	
Calcium	80 - 120	29800.0000	N	26300.0000		2520.0000	137.0	N	P	* NQ
Chromium	80 - 120	71.7000	N	59.4000		10.1000	123.0	N	P	NQ MSD OK
Cobalt	80 - 120	32.5000		10.5000		25.2000	87.0		P	
Copper	80 - 120	31.8000		19.9000		12.6000	95.0		P	
Iron	80 - 120	39800.0000	N	38000.0000		50.4000	3480.0	N	P	* NQ
Lead	80 - 120	37.0000		15.0000		25.2000	88.0		P	
Magnesium	80 - 120	9750.0000		7140.0000		2520.0000	104.0		P	
Manganese	80 - 120	867.0000		838.0000		25.2000	115.0		P	
Nickel	80 - 120	40.4000		17.1000		25.2000	92.0		P	
Potassium	80 - 120	10300.0000	N	7170.0000		2520.0000	123.0	N	P	NQ MSD OK
Silver	75 - 120	1.9200		1.0000		2.5200	76.0		P	
Sodium	80 - 120	2920.0000		658.0000		2520.0000	90.0		P	
Vanadium	80 - 120	95.8000		67.6000		25.2000	112.0		P	
Zinc	80 - 120	66.7000		41.9000		25.2000	98.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

125

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI15-0211
Lot Number:	G1B050467	**MS Lab Workorder:**	MD4RX - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B050467001D
% Solids	100.0	**QC Batch ID:**	1055301
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	39600.0000	N	33900.0000		101.0000	5610.0	N	P	* NQ
Antimony	80 - 120	9.6000	N	10.0000		25.3000	33.0	N	P	JNJ
Barium	80 - 120	134.0000		43.2000		101.0000	90.0		P	
Beryllium	80 - 120	3.2200		0.9700		2.5300	89.0		P	
Cadmium	80 - 120	2.2800		0.1500	J	2.5300	84.0		P	
Calcium	80 - 120	30700.0000	N	26300.0000		2530.0000	173.0	N	P	* NQ
Chromium	80 - 120	70.4000		59.4000		10.1000	110.0		P	
Cobalt	80 - 120	32.1000		10.5000		25.3000	85.0		P	
Copper	80 - 120	32.3000		19.9000		12.6000	98.0		P	
Iron	80 - 120	38800.0000	N	38000.0000		50.6000	1440.0	N	P	* NQ
Lead	80 - 120	37.0000		15.0000		25.3000	87.0		P	
Magnesium	80 - 120	9760.0000		7140.0000		2530.0000	104.0		P	
Manganese	80 - 120	847.0000	N	838.0000		25.3000	35.0	N	P	* NQ
Nickel	80 - 120	39.9000		17.1000		25.3000	90.0		P	
Potassium	80 - 120	10100.0000		7170.0000		2530.0000	115.0		P	
Silver	75 - 120	1.9300		1.0000		2.5300	76.0		P	
Sodium	80 - 120	2920.0000		658.0000		2530.0000	89.0		P	
Vanadium	80 - 120	94.0000		67.6000		25.3000	105.0		P	
Zinc	80 - 120	70.5000		41.9000		25.3000	113.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

136

	YES	NO	N/A	
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.				
(**NOTE**:Replace "N" with "J", "R" as appropriate.)				
A.1.17.5 **Soil/Sediment**				
Are any spike recoveries:				
(a) less than 10%?	___	[✓]	___	*see Form 5
(b) between 10-74%?	✓*	[___]	___	
(c) between 126-200%?	✓*	[___]	___	* out due to abundance
(d) greater than 200%?	✓*	[___]	___	* out due to abundance
ACTION: If yes for any of the above, proceed as follows:				
If the matrix spike recovery is less than 10%, reject (R) and red-line all associated data (detects & non-detects); if between 10-74%, qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (**NOTE**:Replace "N" with "J" or "R" as appropriate.)				
A.1.18 **Lab Duplicates) - Form VI**				
A.1.18.1 Was the lab duplicate analysis performed:				
For each SDG?	[✓]	___	___	
On one of the SDG samples?	[✓]	___	___	
For each matrix type?	[✓]	___	___	
For each concentration range (low or med.)?	[✓]	___	___	
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___	
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___	

MS/MSD RPD's calculated

Lab Dup

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI11T-0211
Lot Number:	G1B050467	Lab WorkOrder:	MEW9M
Matrix:	SOIL	Lab Sample ID:	G1B050467013
% Solids:	100.0	Date/Time Collected:	02/03/11 13:20
Units:	MG/KG	Date/Time Received:	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15500.000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	12.6000			P
7440-39-3	Barium	21.6000			P
7440-41-7	Beryllium	0.1600	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	155000.00			P
7440-47-3	Chromium	29.1000			P
7440-48-4	Cobalt	4.9000			P
7440-50-8	Copper	18.3000			P
7439-89-6	Iron	19800.000			P
7439-92-1	Lead	1.3000	J		P
7439-95-4	Magnesium	5510.0000			P
7439-96-5	Manganese	371.0000			P
7440-02-0	Nickel	8.4000			P
7440-09-7	Potassium	2370.0000			P
7782-49-2	Selenium	0.5700	~~B~~		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	263.0000			P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	44.4000			P
7440-66-6	Zinc	27.9000			P

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.
Results and reporting limits have been adjusted for dry weight

JC 4-22-11

132

Form 1 Analysis Data Sheet Equivalent

Lab Dup

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI11T-0211
Lot Number:	G1B050467	Lab WorkOrder:	MEW9L
Matrix:	SOIL	Lab Sample ID:	G1B050467012
% Solids:	100.0	Date/Time Collected:	02/03/11 13:20
Units:	MG/KG	Date/Time Received:	02/05/11 9:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16300.000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	14.7000			P
7440-39-3	Barium	23.5000			P
7440-41-7	Beryllium	0.1900	J		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	155000.00			P
7440-47-3	Chromium	30.9000			P
7440-48-4	Cobalt	5.2000			P
7440-50-8	Copper	24.5000			P
7439-89-6	Iron	21000.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	5770.0000			P
7439-96-5	Manganese	392.0000			P
7440-02-0	Nickel	8.9000			P
7440-09-7	Potassium	2500.0000			P
7782-49-2	Selenium	1.3000			P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	270.0000			P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	47.1000			P
7440-66-6	Zinc	29.8000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/22/11

LAB DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI11T-0211 (12)
Duplicate Sample ID: VEECA-4SMI11T-0211 (13)

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	16300	15500	5
arsenic	14.7	12.6	15
barium	23.5	21.6	8
beryllium	0.19	0.16	17
calcium	155000	155000	0
chromium	30.9	29.1	6
cobalt	5.2	4.9	6
copper	24.5	18.3	29
iron	21000	19800	6
magnesium	5770	5510	5
manganese	392	371	6
nickel	8.9	8.4	6
potassium	2500	2370	5
selenium	1.3	0.57	78
sodium	270	263	3
vanadium	47.1	44.4	6
zinc	29.8	27.9	7

COMMENTS: Lab designated lab dup - not used to qualify samples - no impact on reported results.

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

Note: lab performed MS/MSD on EB sample but ΔV did not use to assess. Used LCS results for QC blanks only

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report.)	[___]	✓	✓

Not in this SDG

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS)- Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[___]	___	___
	Each batch samples digested/distilled?	[___]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[___]	___	___
	Was an LCS prepared and analyzed with the samples?	[___]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A

more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:			
Less than 50%?	___	[___]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[___]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[___]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	✓	[___]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples	For QC blks NQ		
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	✓
	≥ 100%?	___	[✓]	✓

XZcorr
JAC 42511

ACTION:
If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.

(**NOTE**:Replace "E" with "J" or "R" as appropriate.)

A.1.22 **Total/Dissolved or Inorganic/Total Analytes**

A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓

ACTION:
If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled:

(1) The dissolved(or inorganic)concentration is greater than total concentration, and
(2) greater than or equal to 5xMDL.

A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L, Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓] dilutions performed	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	✓
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively? per lab SOP	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

		YES	NO	N/A
	0.1 amu for each isotope in the tuning solution?	[✓]	___	___
	Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___
	ACTION: If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".			
A.1.26	**ICP-MS Internal Standards - Form XV**			
A.1.26.1	Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
	Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___
	ACTION: If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.			
A.1.26.2	Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 per SAP of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
	If no, was the original sample diluted ~~two fold~~ 1:5, Internal Standard added and the sample re-analyzed?	[✓]	___	___
	Was the %RI for the ~~two fold~~ 1:5 diluted sample within the acceptance limits ~~(60-125%)~~ 30-120?	[✓]	___	___
	ACTION: If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter			

Dilutions were performed as necessary

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI11-0211
Duplicate Sample ID: VEECA-4SMI11T-0211
Triplicate Sample ID: VEECA-4SMI11TT-0211

Water: RPD>30%
Soil: RPD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	16500	15500	16500	577.35	16166.67	4%
barium	22.5	21.6	22.1	0.45	22.07	2%
beryllium	0.18	0.16	0.2	0.02	0.18	11%
calcium	153000	155000	152000	1527.53	153333.33	1%
chromium	31.3	29.1	31.3	1.27	30.57	4%
cobalt	5.1	4.9	5.1	0.12	5.03	2%
copper	20.9	18.3	19.4	1.31	19.53	7%
iron	21100	19800	21300	814.45	20733.33	4%
lead	1.3		1.8	0.35	1.55	23%
magnesium	5800	5510	5800	167.43	5703.33	3%
manganese	389	371	389	10.39	383.00	3%
nickel	9.1	8.4	8.9	0.36	8.80	4%
potassium	2530	2370	2540	95.39	2480.00	4%
sodium	272	263	268	4.51	267.67	2%
vanadium	47.3	44.4	48.1	1.95	46.60	4%
zinc	30.9	27.9	29.6	1.50	29.47	5%
arsenic	14.5	14.6	14.5	0.06	14.53	0%
selenium	1.2	1.2	1.2	0.00	1.20	0%

COMMENTS: No qualifications required.

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/3-2/4
Received Date: 2/5, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/17 soils, no prep. for waters
Analysis Dates: 2/17 soils, 2/7 for waters

All holding time requirements were met with the following exception. Samples VEECA-EB02-020411-SMI and VEECA-EB01-020411-SMI exceeded the 24 hour holding time allowed for hexavalent chromium analysis. The reported non-detect result in these samples were qualified as estimated UJ.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
Grinding Blank #1	hexavalent chromium	2.1 J ug/L	LOD

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code
VEECA-4SBMI15-0211, VEECA-4SBMI13-0211	hexavalent chromium	U at LOD	GBL

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-4SMI15-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID: NONE

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported for the target analyte. One sample was reported at an elevated reporting limit due to observed matrix interference. This result was flagged with a G flag by the laboratory. This flag was crossed out and the results were reported unqualified in the final DV report. Clarification of the calculations was requested from the laboratory.

Reviewer JA Cleveland Date: 4/25/11

CH2M Hill Inc

Client Sample ID: Grinding Blank #1

General Chemistry

Lot-Sample #...: G1B050467-011 Work Order #...: MEQ17 Matrix.....: WATER
Date Sampled...: 02/04/11 11:35 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	2.1 J	10.0	ug/L	SW846 7196A	02/17/11	1057081

Dilution Factor: 1 Analysis Time..: 16:38 DL.....: 2.0

NOTE(S):

RL Reporting Limit

J Estimated result. Result is less than RL.

Flag samples as noted in DVR
JHC
4/25/11

Lab Dup

CH2M Hill Inc

Client Sample ID: VERCA-4SMI11T-0211

General Chemistry

Lot-Sample #...: G1B050467-012 Work Order #...: MEW9L Matrix.....: SOLID
Date Sampled...: 02/03/11 13:20 Date Received..: 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:41 DL.....: 0.010

JC 4/22/11

155

Lab Dup

CH2M Hill Inc

Client Sample ID: VERCA-4SMI11T-0211

General Chemistry

Lot-Sample #...: G1B050467-013 **Work Order #...:** MEW9M **Matrix.....:** SOLID
Date Sampled...: 02/03/11 13:20 **Date Received..:** 02/05/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/17/11	1054266

Dilution Factor: 1 Analysis Time..: 16:41 DL.....: 0.010

JMC 4/2/11

Hexavalent Chromium Calcs - ICAL soils - 2/17/11

X - Response	Y - Concentration (mg/L)
0	0
0.004	0.005
0.008	0.01
0.021	0.025
0.04	0.05
0.079	0.1

slope, m (A1) =	1.266070637
y-int, (A0) =	-0.000407123
r =	0.999864515
Rr2=	0.999729049

VEECA-4SMI15-0211MS Lab Value - 0.250 mg/Kg

Response = 0.04

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.050235703 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.04
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.249928871 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B090534, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B090534. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-4SMI03-0211	G1B090534-001	soil	X	X	X	X	X
VEECA-2SMI03-0211	G1B090534-002	soil	X	X	X	X	X
VEECA-2SMI04-0211	G1B090534-003	soil	X	X	X	X	X
VEECA-1SMI01-0211	G1B090534-004	soil	X	X	X	X	X
VEECA-1SMI02-0211	G1B090534-005	soil	X	X	X	X	X
VEECA-2SMI05-0211	G1B090534-006	soil	X	X	X	X	X
VEECA-1SMI01T-0211	G1B090534-007	soil	X	X	X	X	X
VEECA-1SMI01TT-0211	G1B090534-008	soil	X	X	X	X	X
VEECA-4SMI05-0211	G1B090534-009	soil	X	X	X	X	X
VEECA-EB01-020811-SMI	G1B090534-012	water	X	X	X	X	X
VEECA-1SMI02-0211 MS	G1B090534-005MS	soil	X	X	X	X	X
VEECA-1SMI02-0211 MSD	G1B090534-005MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: sample VEECA-EB01-020811-SMI – equipment blank; and samples VEECA-1SMI01T-0211 and VEECA-1SMI01TT-0211-field triplicate of sample VEECA-1SMI01-0211.

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	
• HPLC Performance	*
• ICP MS Tuning	*
• Initial/Continuing Calibrations	
• ICSA/ICSAB Standards	*
• LLQ Standards	*
• Blanks	
• Internal Standards	*
• Surrogate Recoveries	*
• Laboratory Control Samples	*
• Certified Reference Material	
• Matrix Spike Recoveries	
• Matrix Duplicate RPDs	*
• Serial Dilutions	*
• Field Duplicates	NA
• Field Triplicates	*
• Identification/Quantitation	
• Reporting Limits	*
• Tentatively Identified Compounds	NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

The Certified Reference Material (CRM) exhibited low recoveries for two compounds that resulted in qualifying the non-detected results as rejected in all samples.

Three samples reported positive results that required qualification based on column quantitation %Ds greater than 40%.

Perchlorate

Due to grinding blank contamination, qualifications were added to the data.

Metals

The associated ICV standard exhibited a high recovery for sodium. The reported positive results for sodium in the samples were qualified as estimated J.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

Please note – some of the reported calcium result were flagged as RLA by the laboratory to indicate that the reporting limit were raised because of necessary dilutions. Also some results were flagged with a G to indicate that the reporting limit was raised based on observed matrix interference. These qualifiers were crossed out and no additional validation qualifiers were necessary due to these issues.

Hexavalent Chromium

One sample exceeded the required 24-hour holding time; therefore the positive result was qualified as estimated.

Please note - some results were flagged with a G to indicate that the reporting limit was raised based on observed matrix interference. These qualifiers were crossed out and no additional validation qualifiers were necessary due to this issue.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/7-8/11 and samples were received at the laboratory on 2/9/11. All sample preparation and analysis was

performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Sample VEECA-EB01-020811-SMI exceeded the 24 hour holding time by approximately 7 hours. The reported result was qualified as estimated J/UJ with a qualifier code of HT.

Initial/Continuing Calibrations

Metals

The associated ICVs analyzed 2/14/11 at 1544 and 3/3/11 at 1647 exhibited recoveries for sodium that were above the upper QC limit of 110% at 117.2% and 116.8%, respectively. Therefore the reported positive results for sodium were qualified as estimated J in all samples, with a qualifier code of CCH.

Blanks

Perchlorate

The associated method, grinding and/or QC blanks exhibited contamination as noted in the following table.

Blank ID	Compound	Concentration	LOD/LOQ
Grinding Blank: G1B230000-375	perchlorate	0.45J ug/kg	0.4/5.0 ug/kg

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

Sample ID	Compound	Q Flag	Qual Code
VEECA-4SMI03-0211, VEECA-2SMI03-0211, VEECA-2SMI04-0211, VEECA-2SMI05-0211, VEECA-4SMI05-0211	perchlorate	report at value with U	GBL
VEECA-1SMI02-0211, VEECA-1SMI01T-0211	perchlorate	report at LOD with U	GBL

Metals

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B090534013	potassium sodium	272J ug/L/ 13.6 mg/Kg 528 ug/L/26.4 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg

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

Sample ID	Analyte	Q Flag	Q Code
VEECA-1SMI01-0211, VEECA-1SMI02-0201, VEECA-1SMI01T-0211, VEECA-1SMI01TT-0201	potassium	J	GBL
VEECA-4SMI03-0211, VEECA-2SMI03-0201, VEECA-2SMI04-0211, VEECA-2SMI05-0201, VEECA-4SMI05-0211	sodium	J	GBL

Certified Reference Material

Explosives

The CRM associated with all samples exhibited low recoveries for 3-nitrotoluene at 58% (QC limit 69-124%) and nitrobenzene at 52% (58-119%); therefore all positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R), qualifier code: CRML.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS/MSD	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SMI03-0211	antimony	all soil samples	28/28	J/UJ	MSL
	chromium		122/139	J	MSH

Identification/Quantitation

Explosives

Qualifications were required in the samples due to high (>40%) column quantitation %Ds. Region II guidelines were followed in applying these qualifications. Sample results were flagged as noted in the following table.

Sample ID	Compound	Column Quant %D	Qualifier	Q Code
VEECA-4SMI03-0211	1,3,5-trinitrobenzene	175%	R	2C
	2,4-dinitrotoluene	196%	R	
	nitrobenzene	92%	NJ	
VEECA-2SMI03-0211	1,3,5-trinitrobenzene	120%	R	
VEECA-4SMI05-0211	1,3,5-trinitrobenzene	67%	NJ	
	HMX	155%	NJ	

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
all samples	3-nitrotoluene nitrobenzene	+/-	J/R	CRML
VEECA-4SMI03-0211	1,3,5-trinitrobenzene 2,4-dinitrotoluene	+	R	2C
VEECA-4SMI03-0211	nitrobenzene	+	NJ	2C
VEECA-2SMI03-0211	1,3,5-trinitrobenzene	+	R	2C
VEECA-4SMI05-0211	1,3,5-trinitrobenzene HMX	+	NJ	2C

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
VEECA-4SMI03-0211, VEECA-2SMI03-0211, VEECA-2SMI04-0211, VEECA-2SMI05-0211, VEECA-4SMI05-0211	perchlorate	+	report at value with U	GBL
VEECA-1SMI02-0211, VEECA-1SMI01T-0211	perchlorate	+	report at LOD with U	GBL

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	sodium	+	J	CCH
VEECA-1SMI01-0211, VEECA-1SMI02-0201, VEECA-1SMI01T-0211, VEECA-1SMI01TT-0201	potassium	+	J	GBL
VEECA-4SMI03-0211, VEECA-2SMI03-0201, VEECA-2SMI04-0211, VEECA-2SMI05-0201, VEECA-4SMI05-0211	sodium	+	J	GBL
all soil samples	antimony	+/-	J/UJ	MSL
all soil samples	chromium	+	J	MSH

Hexavalent Chromium

Sample ID	Compound	Results	Q flag	Q Code
VEECA-EB01-020811-SM1	hexavalent chromium	+	J	HT

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

CH2M Hill Inc

Client Sample ID: VERCA-EB01-020811-SMI

HPLC

Lot-Sample #...: G1B090534-012 Work Order #...: MD7761A4 Matrix.....: WATER
Date Sampled...: 02/08/11 07:30 Date Received..: 02/09/11
Prep Date.....: 02/11/11 Analysis Date..: 02/23/11
Prep Batch #...: 1042184 Analysis Time..: 22:11
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.050 U	0.50	ug/L	0.025
1,3,5-Trinitrobenzene	0.050 U	0.099	ug/L	0.031
1,3-Dinitrobenzene	0.050 U	0.15	ug/L	0.050
2,4,6-Trinitrotoluene	0.050 U	0.15	ug/L	0.050
2,4-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2,6-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2-Amino-4,6-dinitrotoluene	0.099 U	0.30	ug/L	0.099
2-Nitrotoluene	0.099 U	0.99	ug/L	0.087
3-Nitrotoluene	0.099 ~~U~~ R CRML	0.50	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.050 U	0.15	ug/L	0.050
4-Nitrotoluene	0.099 U	0.99	ug/L	0.087
HMX	0.050 U	0.15	ug/L	0.036
Nitrobenzene	0.050 ~~U~~ R CRML	0.15	ug/L	0.050
Nitroglycerin	0.50 U	0.99	ug/L	0.33
PETN	0.50 U	0.99	ug/L	0.30
RDX	0.050 U	0.25	ug/L	0.036
Tetryl	0.050 U	0.15	ug/L	0.050

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(84 - 125)

UM 05/11/11

U11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI03-0211

HPLC

Lot-Sample #...: G1B090534-001 Work Order #...: MD7661A4 Matrix.....: SOLID
Date Sampled...: 02/07/11 09:30 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 11:05
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	26 J,~~PG~~ R2C	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	10 J,~~PG~~ R2C	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R CRML	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	98 J,~~PG~~ NJ,2C	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

MM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-2SMI03-0211

HPLC

Lot-Sample #...: G1B090534-002 Work Order #...: MD77K1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 08:55 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 11:48
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	21 ~~J, PG~~ R2C	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ RCRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ RCRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-2SMI04-0211

HPLC

Lot-Sample #...: G1B090534-003 Work Order #...: MD77L1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 10:55 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 12:31
Dilution Factor: 0.97

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 ~~U~~ RCRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ RCRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(81 - 127)

WM 05/11/11

014

CH2M Hill Inc

Client Sample ID: VEBCA-1SMI01-0211

HPLC

Lot-Sample #...: G1B090534-004 Work Order #...: MD77P1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 13:30 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 13:14
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 ~~U~~ RCRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ RCRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(81 - 127)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-1SMI02-0211

HPLC

Lot-Sample #...: G1B090534-005 Work Order #...: MD77R1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 12:45 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 13:57
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ RCRML	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ RCRML	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-2SMI05-0211

HPLC

Lot-Sample #...: G1B090534-006 Work Order #...: MD77T1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 12:00 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 19:42
Dilution Factor: 0.95

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	28 U	240	ug/kg	9.5
1,3-Dinitrobenzene	28 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	28 U	240	ug/kg	18
2,4-Dinitrotoluene	28 U	240	ug/kg	5.0
2,6-Dinitrotoluene	28 U	240	ug/kg	6.9
2-Amino-4,6-dinitrotoluene	28 U	240	ug/kg	12
2-Nitrotoluene	28 U	240	ug/kg	12
3-Nitrotoluene	28 ~~U~~ RCRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	28 U	240	ug/kg	9.5
4-Nitrotoluene	28 U	240	ug/kg	17
HMX	28 U	240	ug/kg	11
Nitrobenzene	28 ~~U~~ RCRML	240	ug/kg	17
Nitroglycerin	57 U	480	ug/kg	14
PETN	57 U	480	ug/kg	24
RDX	28 U	240	ug/kg	11
Tetryl	28 U	240	ug/kg	9.5

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VERCA-1SMI01T-0211

HPLC

Lot-Sample #...: G1B090534-007 Work Order #...: MD77V1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 13:31 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 20:25
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ RCRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ RCRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

VM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VERCA-1SMI01TT-0211

HPLC

Lot-Sample #...: G18090534-008 Work Order #...: MD77X1AF Matrix.....: SOLID
Date Sampled...: 02/07/11 13:32 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 21:08
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ RCRML	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ RCRML	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MM 05/11

015

CH2M Hill Inc

Client Sample ID: VREC4-4SMI05-0211

HPLC

Lot-Sample #...: G1B090534-009 Work Order #...: MD7701AF Matrix.....: SOLID
Date Sampled...: 02/07/11 10:10 Date Received..: 02/09/11
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 21:50
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	12 ~~J,PG~~ NJ 2C	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 ~~U~~ RCRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	27 ~~J,PG~~ NJ 2C	240	ug/kg	12
Nitrobenzene	29 ~~U~~ RCRML	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

MM 05/11/11

026

CH2M Hill Inc

Client Sample ID: VEECA-4SMI03-0211

HPLC

Lot-Sample #...:	G1B090534-001	Work Order #...:	MD7661A5	Matrix.....:	SOLID
Date Sampled...:	02/07/11 09:30	Date Received..:	02/09/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/25/11		
Prep Batch #...:	1054375	Analysis Time..:	21:18		
Dilution Factor:	0.92				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~1.7 J,B~~ 1.7U,GBL	4.6	ug/kg	0.24

NOTE(S):

~~4.6 U,GBL~~ LM051211

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

LM 042111

021

CH2M Hill Inc

Client Sample ID: VREEA-2SMI03-0211

HPLC

Lot-Sample #...: G1B090534-002 Work Order #...: MD77K1AG Matrix.....: SOLID
Date Sampled...: 02/07/11 08:55 Date Received..: 02/09/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054375 Analysis Time..: 21:35
Dilution Factor: 1.03

Method.....: SW846 6850_DOD Ha

0.85U,GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.85 J,B~~	5.2	ug/kg	0.27

NOTE(S):

~~5.2U,GBL~~ WM 02/2/11

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

WM 02/2/11

U22

CH2M Hill Inc

Client Sample ID: VEECA-2SMI04-0211

HPLC

Lot-Sample #...:	G1B090534-003	Work Order #...:	MD77L1AG	Matrix.....:	SOLID
Date Sampled...:	02/07/11 10:55	Date Received..:	02/09/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/25/11		
Prep Batch #...:	1054375	Analysis Time..:	21:53		
Dilution Factor:	0.94				
		Method.....:	SW846 6850_DOD Ha		

0.98 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.98 J,B~~	4.7	ug/kg	0.24

~~4.7 U, GBL~~ MM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 04/21/11

U25

CH2M Hill Inc

Client Sample ID: VEECA-1SMI01-0211

HPLC

Lot-Sample #...: G1B090534-004 Work Order #...: MD77P1AG Matrix.....: SOLID
Date Sampled...: 02/07/11 13:30 Date Received..: 02/09/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054375 Analysis Time..: 22:10
Dilution Factor: 1.01
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.40 U	5.0	ug/kg	0.26

042111

CH2M Hill.Inc

Client Sample ID: VEECA-1SMI02-0211

HPLC

Lot-Sample #...: G1B090534-005 Work Order #...: MD77R1AG Matrix.....: SOLID
Date Sampled...: 02/07/11 12:45 Date Received..: 02/09/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054375 Analysis Time..: 23:03
Dilution Factor: 0.97

Method.....: SW846 6850_DOD Ha

0.29 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.29 J,B~~	4.8	ug/kg	0.25

~~4.8 U, GBL~~ WM 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

WM 04/21/11

U25

CH2M Hill Inc

Client Sample ID: VEECA-2SMI05-0211

HPLC

Lot-Sample #...: G1B090534-006 Work Order #...: MD77T1AG Matrix.....: SOLID
Date Sampled...: 02/07/11 12:00 Date Received..: 02/09/11
Prep Date.....: 02/23/11 Analysis Date..: 02/25/11
Prep Batch #...: 1054375 Analysis Time..: 23:56
Dilution Factor: 0.94

Method.....: SW846 6850_DOD Ha

0.75 U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.75 J,B~~	4.7	ug/kg	0.24

~~4.7 U, GBL~~ LM 05/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

LM 04/11

CH2M Hill Inc

Client Sample ID: VERCA-1SMI01T-0211

HPLC

Lot-Sample #...:	G1B090534-007	Work Order #...:	MD77V1AG	Matrix.....:	SOLID
Date Sampled...:	02/07/11 13:31	Date Received..:	02/09/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054375	Analysis Time..:	00:13		
Dilution Factor:	0.97				
		Method.....:	SW846 6850_DOD Ha		

0.39 UGBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.27 J,B~~	4.8	ug/kg	0.25

~~4.8 U,GBL~~ MM 05/12/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

MM 3/4/2011

CH2M Hill Inc

Client Sample ID: VEECA-1SMI01TT-0211

HPLC

Lot-Sample #...: G1B090534-008 **Work Order #...:** MD77X1AG **Matrix.....:** SOLID
Date Sampled...: 02/07/11 13:32 **Date Received..:** 02/09/11
Prep Date.....: 02/23/11 **Analysis Date..:** 02/26/11
Prep Batch #...: 1054375 **Analysis Time..:** 00:31
Dilution Factor: 1.04
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.42 U	5.2	ug/kg	0.27

WM 042411

028

CH2M Hill Inc

Client Sample ID: VERCA-4SMI05-0211

HPLC

Lot-Sample #...:	G1B090534-009	Work Order #...:	MD7701AG	Matrix.....:	SOLID
Date Sampled...:	02/07/11 10:10	Date Received..:	02/09/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054375	Analysis Time..:	00:48		
Dilution Factor:	0.92				

Method.....: SW846 6850_DOD Ha

0.88U, GBL

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	~~0.88 J,B~~	4.6	ug/kg	0.24

~~4.6 U, GBL~~ 1/M 05/2/11

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

WM 2/4/2011

625

CH2M Hill Inc

Client Sample ID: VEECA-KB01-020811-SMI

Dissolved HPLC

Lot-Sample #...:	G1B090534-012	Work Order #...:	MD7762A3	Matrix.....:	WATER
Date Sampled...:	02/08/11 07:30	Date Received..:	02/09/11		
Prep Date.....:	02/22/11	Analysis Date..:	02/23/11		
Prep Batch #...:	1053108	Analysis Time..:	17:30		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

WM 2/22/11

036

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	**Client Sample ID:**	VEECA-4SMI03-0211
Lot Number:	G1B090534	**Lab WorkOrder:**	MD766
Matrix:	SOIL	**Lab Sample ID:**	G1B090534001
% Solids:	100.0	**Date/Time Collected:**	02/07/11 9:30
Units:	MG/KG	**Date/Time Received:**	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	18700.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	6.1000			P
7440-39-3	Barium	38.8000			P
7440-41-7	Beryllium	0.2100	J		P
7440-43-9	Cadmium	0.2800	J		P
7440-70-2	Calcium	78300.0000	~~B~~		P
7440-47-3	Chromium	47.7000		J MSH	P
7440-48-4	Cobalt	11.4000			P
7440-50-8	Copper	21.6000			P
7439-89-6	Iron	23800.0000	~~B~~		P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	6900.0000			P
7439-96-5	Manganese	832.0000			P
7440-02-0	Nickel	12.8000			P
7440-09-7	Potassium	3270.0000			P
7782-49-2	Selenium	1.1000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	384.0000	~~J~~	J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	66.2000			P
7440-66-6	Zinc	33.5000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/26/11

Form 1 Analysis Data Sheet Equivalent

U31

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	**Client Sample ID:**	VEECA-2SM03-0211
Lot Number:	G1B090534	**Lab WorkOrder:**	MD77K
Matrix:	SOIL	**Lab Sample ID:**	G1B090534002
% Solids:	100.0	**Date/Time Collected:**	02/07/11 8:55
Units:	MG/KG	**Date/Time Received:**	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	23200.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	9.3000			P
7440-39-3	Barium	49.3000			P
7440-41-7	Beryllium	0.2500	J		P
7440-43-9	Cadmium	0.2800	J		P
7440-70-2	Calcium	73500.0000	~~B~~		P
7440-47-3	Chromium	49.7000		J MSH	P
7440-48-4	Cobalt	11.0000			P
7440-50-8	Copper	22.1000			P
7439-89-6	Iron	26700.0000	~~B~~		P
7439-92-1	Lead	1.7000	J		P
7439-95-4	Magnesium	7730.0000			P
7439-96-5	Manganese	651.0000			P
7440-02-0	Nickel	14.9000			P
7440-09-7	Potassium	4990.0000			P
7782-49-2	Selenium	0.7400	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	947.0000		J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	66.7000			P
7440-66-6	Zinc	37.1000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/2/11

Form I Analysis Data Sheet Equivalent

032

CH2M HILL Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-2SMI04-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD77L
Matrix:	SOIL	Lab Sample ID:	G1B090534003
% Solids:	100.0	Date/Time Collected:	02/07/11 10:55
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16300.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.9000			P
7440-39-3	Barium	26.1000			P
7440-41-7	Beryllium	0.1600	J		P
7440-43-9	Cadmium	0.2500	J		P
7440-70-2	Calcium	130000.0000	~~B~~		P
7440-47-3	Chromium	29.1000		J MSH	P
7440-48-4	Cobalt	8.0000			P
7440-50-8	Copper	21.6000			P
7439-89-6	Iron	19100.0000	~~B~~		P
7439-92-1	Lead	9.8000			P
7439-95-4	Magnesium	7340.0000			P
7439-96-5	Manganese	556.0000			P
7440-02-0	Nickel	9.2000			P
7440-09-7	Potassium	3380.0000			P
7782-49-2	Selenium	0.8600	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	302.0000		J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	42.5000			P
7440-66-6	Zinc	63.8000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/20/11

Form 1 Analysis Data Sheet Equivalent

U 35

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-1SM001-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD77P
Matrix:	SOIL	Lab Sample ID:	G1B090534004
% Solids:	100.0	Date/Time Collected:	02/07/11 13:30
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	548.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	7.0000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	315000.0000	~~B RLA~~		P
7440-47-3	Chromium	6.9000		J MSH	P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	1.1000	J		P
7439-89-6	Iron	752.0000	~~B~~		P
7439-92-1	Lead	5.0000	~~GU~~		P
7439-95-4	Magnesium	15000.0000			P
7439-96-5	Manganese	27.9000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	169.0000	J		P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2530.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	3.9000	J		P
7440-66-6	Zinc	5.0000	U		P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JLC 4/26/11

Form I Analysis Data Sheet Equivalent

034

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-1SMI02-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD77R
Matrix:	SOIL	Lab Sample ID:	G1B090534005
% Solids:	100.0	Date/Time Collected:	02/07/11 12:45
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	535.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	7.0000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	324000.0000	~~B RLA~~		P
7440-47-3	Chromium	6.8000		J MSH	P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	2.5000	U		P
7439-89-6	Iron	758.0000	~~B~~		P
7439-92-1	Lead	5.0000	GU		P
7439-95-4	Magnesium	15500.0000			P
7439-96-5	Manganese	28.5000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	177.0000	J		P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2650.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	3.9000	J		P
7440-66-6	Zinc	5.0000	U		P

U Result is less than the reporting limit. (QL)

B Method blank contamination. Analyte detected at a reportable level in blank.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-2SMI05-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD77T
Matrix:	SOIL	Lab Sample ID:	G1B090534006
% Solids:	100.0	Date/Time Collected:	02/07/11 12:00
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16800.0000			P
7440-36-0	Antimony	10.0000	~~B~~	UJ MSL	P
7440-38-2	Arsenic	8.0000			P
7440-39-3	Barium	23.4000			P
7440-41-7	Beryllium	0.1800	J		P
7440-43-9	Cadmium	0.1500	J		P
7440-70-2	Calcium	134000.0000	~~B~~		P
7440-47-3	Chromium	27.8000		J MSH	P
7440-48-4	Cobalt	5.6600			P
7440-50-8	Copper	20.8000			P
7439-89-6	Iron	19000.0000	~~B~~		P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	8800.0000			P
7439-96-5	Manganese	396.0000			P
7440-02-0	Nickel	9.2000			P
7440-09-7	Potassium	3730.0000			P
7782-49-2	Selenium	1.1000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	800.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	39.3000			P
7440-66-6	Zinc	31.4000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

Form 1 Analysis Data Sheet Equivalent

036

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-1SMI01T-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD77V
Matrix:	SOIL	Lab Sample ID:	G1B090534007
% Solids:	100.0	Date/Time Collected:	02/07/11 13:31
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	575.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	7.1000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	315000.0000	~~B RLA~~		P
7440-47-3	Chromium	6.9000		J MSH	P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	2.5000	U		P
7439-89-6	Iron	763.0000	~~B~~		P
7439-92-1	Lead	5.0000	~~GU~~		P
7439-95-4	Magnesium	15000.0000			P
7439-96-5	Manganese	29.7000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	165.0000	J		P
7782-49-2	Selenium	1.4000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2520.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	3.9000	J		P
7440-66-6	Zinc	5.0000	U		P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JMC 4/26/11

Form I Analysis Data Sheet Equivalent

U J 1

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	**Client Sample ID:**	VEECA-1SMI01TT-0211
Lot Number:	G1B090534	**Lab WorkOrder:**	MD77X
Matrix:	SOIL	**Lab Sample ID:**	G1B090534008
% Solids:	100.0	**Date/Time Collected:**	02/07/11 13:32
Units:	MG/KG	**Date/Time Received:**	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	508.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	1.7000	J		P
7440-39-3	Barium	6.6000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	380000.0000	~~B RLA~~		P
7440-47-3	Chromium	6.4000		J MSH	P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	2.5000	U		P
7439-89-6	Iron	695.0000	~~B~~		P
7439-92-1	Lead	5.0000	~~QU~~		P
7439-95-4	Magnesium	14400.0000			P
7439-96-5	Manganese	26.4000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	156.0000	J		P
7782-49-2	Selenium	2.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2420.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	3.6000	J		P
7440-66-6	Zinc	5.0000	U		P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

JAC 4/26/11

Results and reporting limits have been adjusted for dry weight

Form 1 Analysis Data Sheet Equivalent

U 3 6

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-4SM05-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD770
Matrix:	SOIL	Lab Sample ID:	G1B090534009
% Solids:	100.0	Date/Time Collected:	02/07/11 10:10
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	21100.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	8.0000			P
7440-39-3	Barium	33.9000			P
7440-41-7	Beryllium	0.2600	J		P
7440-43-9	Cadmium	0.2300	J		P
7440-70-2	Calcium	64900.0000	~~B~~		P
7440-47-3	Chromium	37.1000		J MSH	P
7440-48-4	Cobalt	12.5000			P
7440-50-8	Copper	24.8000			P
7439-89-6	Iron	27200.0000	~~B~~		P
7439-92-1	Lead	1.7000	J		P
7439-95-4	Magnesium	7580.0000			P
7439-96-5	Manganese	737.0000			P
7440-02-0	Nickel	13.3000			P
7440-09-7	Potassium	3580.0000			P
7782-49-2	Selenium	1.6000			P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	273.0000	~~+~~	J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	71.4000			P
7440-66-6	Zinc	39.4000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

Form 1 Analysis Data Sheet Equivalent

U 35

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	**Client Sample ID:**	VEECA-EB01-020811-SMI
Lot Number:	G1B090534	**Lab WorkOrder:**	MD776
Matrix:	WATER	**Lab Sample ID:**	G1B090534012
% Solids:	0.0	**Date/Time Collected:**	02/08/11 7:30
Units:	UG/L	**Date/Time Received:**	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	99.6000	~~JB~~		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	263.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

JPC 4/26/11

Form 1 Analysis Data Sheet Equivalent

U4U

CH2M Hill Inc

Client Sample ID: VEECA-4SMI03-0211

General Chemistry

Lot-Sample #...: G1B090534-001 **Work Order #...:** MD766 **Matrix.....:** SOLID
Date Sampled...: 02/07/11 09:30 **Date Received..:** 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	02/28/11	1057087
	Dilution Factor: 1			Analysis Time..: 15:35	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
	Dilution Factor: 1			Analysis Time..: 17:26	DL.....: 0.010	

JAC 42611

041

CH2M Hill Inc

Client Sample ID: VEECA-2SMI03-0211

General Chemistry

Lot-Sample #...: G1B090534-002 **Work Order #...:** MD77K **Matrix.....:** SOLID
Date Sampled...: 02/07/11 08:55 **Date Received..:** 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.8	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:39	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 1		Analysis Time..: 17:28	DL.....: 0.010	

JAC 4/26/11

U42

CH2M Hill Inc

Client Sample ID: VEECA-2SMI04-0211

General Chemistry

Lot-Sample #...: G1B090534-003 **Work Order #...:** MD77L **Matrix.....:** SOLID
Date Sampled...: 02/07/11 10:55 **Date Received..:** 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:43	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 1		Analysis Time..: 17:28	DL.....: 0.010	

JBC 4/26/11

045

CH2M Hill Inc

Client Sample ID: VEECA-1SMI01-0211

General Chemistry

Lot-Sample #...: G1B090534-004 Work Order #...: MD77P Matrix.....: SOLID
Date Sampled...: 02/07/11 13:30 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:47	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 1		Analysis Time..: 17:29	DL.....: 0.010	

JBC 4/26/11

044

CH2M Hill Inc

Client Sample ID: VEECA-1SMI02-0211

General Chemistry

Lot-Sample #...: G1B090534-005 Work Order #...: MD77R Matrix.....: SOLID
Date Sampled...: 02/07/11 12:45 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.7	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 15:51	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 1		Analysis Time..: 17:29	DL.....: 0.010	

JAC
4/26/11

640

CH2M Hill Inc

Client Sample ID: VERCA-2SMI05-0211

General Chemistry

Lot-Sample #...: G1B090534-006 Work Order #...: MD77T Matrix.....: SOLID
Date Sampled...: 02/07/11 12:00 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 16:06	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 1		Analysis Time..: 17:31	DL.....: 0.010	

JBC 4/26/11

046

CH2M Hill Inc

Client Sample ID: VERCA-1SMI01T-0211

General Chemistry

Lot-Sample #...: G1B090534-007 Work Order #...: MD77V Matrix.....: SOLID
Date Sampled...: 02/07/11 13:31 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085

Dilution Factor: 1 Analysis Time..: 17:31 DL.....: 0.010

JAC 4/26/11

041

CH2M Hill Inc

Client Sample ID: VEECA-1SMI01TT-0211

General Chemistry

Lot-Sample #...: G1B090534-008 Work Order #...: MD77X Matrix.....: SOLID
Date Sampled...: 02/07/11 13:32 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	02/26/11	1057085

Dilution Factor: 1 Analysis Time..: 17:32 DL.....: 0.010

JC 4/26/11

640

CH2M Hill Inc

Client Sample ID: VREGA-4SMI05-0211

General Chemistry

Lot-Sample #...: G1B090534-009 Work Order #...: MD770 Matrix.....: SOLID
Date Sampled...: 02/07/11 10:10 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.0	0.10	--	SW846 9045C	02/28/11	1057087
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 0.10	
Hexavalent Chromium	0.12 U G	0.25	mg/kg	SW846 7196A	02/26/11	1057085
		Dilution Factor: 5		Analysis Time..: 17:32	DL.....: 0.050	

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/20/11

645

CH2M Hill Inc

Client Sample ID: VEECA-4SMI05-0211

General Chemistry

Lot-Sample #...: G1B090534-010 Work Order #...: MD772 Matrix.....: SOLID
Date Sampled...: 02/07/11 10:10 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.12 U G	0.25	mg/kg	SW846 7196A	02/26/11	1057085

Dilution Factor: 5 Analysis Time..: 17:32 DL.....: 0.050

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JJC 4/26/11

056

CH2M Hill Inc

Client Sample ID: VEECA-4SMI05-0211

General Chemistry

Lot-Sample #...: G1B090534-011 Work Order #...: MD774 Matrix.....: SOLID
Date Sampled...: 02/07/11 10:10 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.12 U G	0.25	mg/kg	SW846 7196A	02/26/11	1057085

Dilution Factor: 5 Analysis Time..: 17:33 DL.....: 0.050

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JC 4/26/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020811-SMI

General Chemistry

Lot-Sample #...: G1B090534-012 Work Order #...: MD776 Matrix.....: WATER
Date Sampled...: 02/08/11 07:30 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ WJ HT	10.0	ug/L	SW846 7196A	02/09/11	1040339

Dilution Factor: 1 Analysis Time..: 13:59 DL.....: 2.0

JSC 4/26/11

052

Case Narrative

TestAmerica West Sacramento Project Number G1B090534

General Comments

Please note sample VEECA-EB01-020811-SMI was received past the 24 hour recommended holding time for hexavalent chromium. Also the sample containers for sample VEECA-1SMI02-0211 were marked for matrix spike/matrix spike duplicate (MS/MSD) but the chain of custody (COC) didn't specify MS/MSD for this sample.

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Samples for analysis of all methods were processed by Incremental Sampling Method techniques (ISM) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

The data for the laboratory duplicate and triplicate are reported as samples 10 and 11 for all methods. The native sample is 9, client ID VEECA-4SMI05-0211. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of each summary section.

SOLID, 8330B, Nitroaromatics & Nitramines
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
The certified reference material (CRM) associated with this extraction batch and reported as work order MEMCX1AE has a low recovery, outside the established control limits for Nitrobenzene and 3-Nitrotoluene. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control.

The grinding blank associated with these samples has been reported as a method blank with work order MEMCX1AD.

Case Narrative

TestAmerica West Sacramento Project Number G1B090534

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Certified Reference Material (CRM) was not immediately available for the incremental sampling method (ISM) as requested for 6850 (perchlorate) analysis. A 200 gram aliquot of Ottawa Sand was fortified with 10ug of Perchlorate (5.0 ug/Kg), mixed well, air dried and ground via puck mill. It was then sampled as per the ISM procedure. A 3 gram portion was extracted in a batch for method 6850. The results are as follows:

Description	Result (ug/Kg)	Comment
Method Blank	ND	RL 5.0 ug/Kg
LCS	4.7	94% Recovery (Limit 80-120%)
Puck Mill Blank	ND	RL 5.0 ug/Kg
Puck Mill LCS	4.2	83% Recovery (Limit 80-120%)

The Puck Mill Blank and Puck Mill LCS are the ISM processed samples and the results demonstrate the ISM process is in control. Please see supporting data in the Appendix section.

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MERJD1AC
SMCS: MERJD1AE

The grinding blank associated with these samples and reported under work order MERJD1AD had a detection for perchlorate at a level between the Limit of Quanitation (LOQ) of 5.0 ug/Kg and the Detection Limit (DL) of 0.26 ug/Kg. This grinding blank is from the Incremental Sampling Method (ISM) process. The method blank is non-detect for perchlorate. Samples having positive detections for perchlorate are flagged with a B, denoting the target analyte is present at a reportable level in the associated grinding blank.

Sample: 7
Manual integration was performed on the above sample for perchlorate primary ion and secondary ion. Detailed information can be found in the Manual Integration Addendum section of this report.

Case Narrative

TestAmerica West Sacramento Project Number G1B090534

WATER, 6850/DOD Handbook, Perchlorate
Samples: 12
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

WATER, 6010/ 6020, Total Metals
Sample: 12
Manganese, nickel, cadmium, barium and zinc are verified trace impurities in the ICS-A solution. As such, they may not meet the acceptance criteria, but corrective action does not apply, per DoD QSM.

The method blank associated with this extraction batch has Potassium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

Sample: 13
The method blank associated with this extraction batch has Iron and Selenium detected below the reporting limit. As the associated samples do not have detections for these analytes, the impact on the data is minimal. The associated sample is the grinding blank

SOLID, 6010B/6020, Metals
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
The recoveries for arsenic, selenium, aluminum, antimony, calcium, chromium, iron and manganese are outside the established control limits for the MS/MSD associated with this batch. The concentration of aluminum, calcium, chromium, iron and manganese in the parent sample is greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

Due to historical results, all samples were analyzed at 5x dilutions. Samples 4,-5, 7, and 8 required additional dilutions for Calcium and Lead.

An aqueous grinding blank was created by rinsing the mortar and pestal before each use and compositing the rinsate. The data has been reported as sample -13. Calcium was detected at a reportable level. There were also detections between the LOQ and DL for aluminum, copper, potassium, magnesium, and sodium.

Case Narrative

TestAmerica West Sacramento Project Number G1B090534

The noted samples required a 5x dilution due to high levels of cations which suppressed the internal standard and caused the closing calibration verification (CCV) to fail criteria. The reporting limits were raised accordingly.

SOLID, 7196A, Hexavalent Chromium
Samples: 1, 3, 4, 5, 6, 7, 8, 9
An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -13.

WATER, 7196A, Hexavalent Chromium
Sample: 12
The noted sample was received in the laboratory after the recommended 24 hour holding time for the test had expired. The samples were analyzed after consultation with the client.

Sampling date: 2/8/11 @ 7:30 am
Received date: 2/9/11
Hold time expiration date: 2/9/11
Analysis Date: 2/9/11

There were no other anomalies associated with this project.

056

Sample Summary

TestAmerica West Sacramento Project Number G1B090534

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MD766	1	VEECA-4SMI03-0211	2/7/2011 09:30 AM	2/9/2011 08:50 AM
MD77K	2	VEECA-2SMI03-0211	2/7/2011 08:55 AM	2/9/2011 08:50 AM
MD77L	3	VEECA-2SMI04-0211	2/7/2011 10:55 AM	2/9/2011 08:50 AM
MD77P	4	VEECA-1SMI01-0211	2/7/2011 01:30 PM	2/9/2011 08:50 AM
MD77R	5	VEECA-1SMI02-0211	2/7/2011 12:45 PM	2/9/2011 08:50 AM
MD77T	6	VEECA-2SMI05-0211	2/7/2011 12:00 PM	2/9/2011 08:50 AM
MD77V	7	VEECA-1SMI01T-0211	2/7/2011 01:31 PM	2/9/2011 08:50 AM
MD77X	8	VEECA-1SMI01TT-0211	2/7/2011 01:32 PM	2/9/2011 08:50 AM
MD770	9	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD772	10	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD774	11	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD776	12	VEECA-EB01-020811-SMI	2/8/2011 07:30 AM	2/9/2011 08:50 AM
ME0HF	13	Grinding Blank #1	2/8/2011 07:30 AM	2/9/2011 08:50 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B090534

COOLER 1

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8747 2112 6541

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX | UPS | CLIENT
Temp Blank | Intact | Not Intact

Analysis and Container Type / Preservative

	Sample Description	Date/Time Collected	Matrix (aq, sd ss, sb)	No of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for implicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-4SMI03-0211	02/07/2011 0930	ss	3		3															
	VEECA-2SMI03-0211	02/07/2011 0855	ss	3		3															
	VEECA-2SMI04-0211	02/07/2011 1055	ss	3		3															

02/08/11

COMMENTS: 28-Day Turn Around Time, non-hazard.

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/08/11 1200	FedEx				Chang Uke 02/08/11 0920
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 373 - 5600

2159

G1B090534

COOLER 2

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth Contact: Victoria Weber	Contract: N62470-08-D-1000	Phone #: (757) 671-6208	Fax #: (773) 695-1378
Address: 5700 Cleveland St, Suite 101	City: Virginia Beach	State: VA	Zip Code: 23462
Project #: 408040.FI.FK.EC	Proj. Name/No.: ECA-RI		Airbill number: 8747 2112 6541
Bill (if different than above): CH2M HILL Inc, A/P	Address: PO Box 241329, Denver, CO 80224		
Sampler (Print/Sign): Dia Whitaker		Copies To:	

LAB USE ONLY

Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX	UPS	CLIENT
Temp Blank	Intact	Not Intact

Analysis and Container Type / Preservatives

				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)			1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area			Grain size	8330 water	8650 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
				4°C, headspace			4°C, headspace			None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
*	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for replicates	EXPLO (8330B List & Perch)	METAL (ICP-AES ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
	VEECA-1SMI01-0211	02/07/2011 1330	ss	3		2															
	VEECA-1SMI02-0211	02/07/2011 1245	ss	3		2															
	VEECA-2SMI05-0211	02/07/2011 1200	ss	3		3															
	VEECA-1SMI01T-0211	02/07/2011 1331	ss	2	2																no pH for T samples
	VEECA1SMI01TT-0211	02/07/2011 1332	ss	2	2																no pH for TT samples

~~* = 3 bottles rec'd~~ 7E 02/08/11
~~** = 2 bottles rec'd~~
DW 02/08/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By: Dia Whitaker	Date/Time: 02/08/11 1200	Received By: FEDEX	Relinquished By:	Date/Time		Received By: Cheng Une 02/09/11 0920
Relinquished By	Date/Time	Received By:	Relinquished By:	Date/Time		Received By

* MS/MSD requested on the bottle - CO 02/09/11

TestAmerica West Sacramento (916) 373-5600

4.5 °C

G1B090534

cooler 3

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1376

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8747 2112 6541

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Die Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info: FEDEX UPS CLIENT
Airbill No:
Temp C: Temp Blank Intact Not Intact

Analysis and Container Type

					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
*	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for duplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
9,10,11	VEECA-4SM05-0211	02/07/2011 1010	ss	3		3															
12	VEECA-EB01-020811-SMI	02/08/2011 0730	aq	5									2	1	1	1					

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
[signature]	02/08/11 1200	FedEx				[signature] 02/09/11 0920
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 373 - 5600

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT Chem Hill PM KS LOG # 61292

LOT# (QUANTIMS ID) G1B070534 QUOTE# 88113 LOCATION W12C

Checked (✓)

DATE RECEIVED 02/09/11 TIME RECEIVED 0850 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) See Multi Cooler Checklist ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☑

Initials: CV Date: 02/09/11

---

pH MEASURED ☑ YES ☐ ANOMALY ☑ N/A CV 02/09/11 ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: CV Date: 02/09/11

Notes HTV

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B090534

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB												2								
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ	3	3	3	2	2	3	2	2	3	3	3									
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn												1								
500PJna																				
500PJzn/na																				
250PJ												2								
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): G1B090534

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600083 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 2 CORRECTED 2 ☑

SAMPLE TEMPERATURE:

OBSERVED: 3 1 2 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): Container 1 of 3 for VEECA-25MED5-0211 also in cooler. (Marked) w/ X on lid. ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ # 5 ☐ ☐ OTHER ☑

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600092, 600082 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: 3 CORRECTED 3 ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 2 2 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

COOLER ID 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600099, 600100 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: 2 CORRECTED 2 ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 2 1 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER ☑

RV 02/09/11

Initials Date

G1B090534

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B090534

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X													✓								
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

TestAmerica West Sacramento (916) 373 - 5600

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B090534

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/7-8/11 Prep 2/11-18/11

8.0 Holding Times Recd 2/9/11 Analy 2/23-24/11

8.1 Have any nitroaromatics and nitroamines technical

 Temp 1-3°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

Listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

Listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? windows not provided, just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

071

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ✓ LCS CRM

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ✓ ___ CRM ✓ LCS

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: G1B090534 Work Order #...: MEMCX1AE Matrix.....: SOLID
LCS Lot-Sample#: G1B180000-384
Prep Date.....: 02/18/11 Analysis Date..: 02/24/11
Prep Batch #...: 1049384 Analysis Time..: 10:22
Dilution Factor: 0.99

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,3,5-Trinitrobenzene	97	(58 - 116)	SW846 8330B
1,3-Dinitrobenzene	91	(69 - 116)	SW846 8330B
2,4,6-Trinitrotoluene	88	(69 - 120)	SW846 8330B
2,4-Dinitrotoluene	90	(69 - 137)	SW846 8330B
2,6-Dinitrotoluene	81	(60 - 121)	SW846 8330B
2-Amino-4,6-dinitrotoluene	81	(56 - 108)	SW846 8330B
2-Nitrotoluene	67	(67 - 117)	SW846 8330B
3-Nitrotoluene	58 a	(69 - 124)	SW846 8330B
4-Amino-2,6-dinitrotoluene	72	(46 - 98)	SW846 8330B
4-Nitrotoluene	65	(63 - 123)	SW846 8330B
HMX	94	(59 - 131)	SW846 8330B
Nitrobenzene	52 a	(58 - 119)	SW846 8330B
Nitroglycerin	72	(60 - 115)	SW846 8330B
PETN	82	(60 - 115)	SW846 8330B
RDX	97	(62 - 123)	SW846 8330B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Soil
0 out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

Soil
0 out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

VEECA-EB01-D20811-SMI No ⊕

676

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ☑ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ☑ ___ ___

b. All blanks ☑ ___ ___

c. Matrix spike samples ☑ ___ ___

d. 5 pt. initial calibration standards ☑ ___ ___

e. Calibration verification standards ☑ ___ ___

f. Laboratory Control samples (LCS) ☑ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ☑ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ✓ ___

not provided only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ✓ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ✓ ___ ___

w/in 1 min

675

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs) must be < 20.0% for all analytes). ☑ ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? ☑ ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence ☑ ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

086

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? see below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data validator checked Cal in sequence and compared RT and checked stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ☑ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ☑ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ☑ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ☑ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___
W/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? NO RT, data Validator checked [ ] ✓ ___

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [✓] ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [✓] ___ ___

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [✓] ___

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ✓ ___

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B090534 1
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 2/24/2011 Analysis Date (2): 2/24/2011

	CMPNAM	Result(Col1)	Result(Col2)	%D	Q	
9.86	1,3,5-Trinitrobenzene	26.43	388.8	175%	PG	28.93 R
	1,3-Dinitrobenzene	ND	NA	NA		
	2,4,6-Trinitrotoluene	ND	NA	NA		
19.72	2,4-Dinitrotoluene	10.19	1073	196%	PG	33.99 R
	2,6-Dinitrotoluene	ND	NA	NA		
	2-Amino-4,6-dinitrotoluene	ND	NA	NA		
	3,5-Dinitroaniline	ND	NA	NA		
	4-Amino-2,6-dinitrotoluene	ND	NA	NA		
	RDX	ND	NA	NA		
	TETRYL	ND	NA	NA		
	m-Nitrotoluene	ND	NA	NA		
14.12	Nitrobenzene	98.39	36.35	92%	PG	22.57 NJ
	Nitroglycerin	ND	NA	NA		
CCal	HMX	ND	NA	NA		CCal 22.55
	o-Nitrotoluene	ND	NA	NA		
14.12	PETN	ND	NA	NA		
	p-Nitrotoluene	ND	NA	NA		

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B090534 2
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 2/24/2011 Analysis Date (2): 2/24/2011

CMPNAM	Result(Col1)	Result(Col2)	%D	Q
1,3,5-Trinitrobenzene	21.2	84.94	120%	PG
1,3-Dinitrobenzene	ND	NA	NA	
2,4,6-Trinitrotoluene	ND	NA	NA	
2,4-Dinitrotoluene	ND	NA	NA	
2,6-Dinitrotoluene	ND	NA	NA	
2-Amino-4,6-dinitrotoluene	ND	NA	NA	
3,5-Dinitroaniline	ND	NA	NA	
4-Amino-2,6-dinitrotoluene	ND	NA	NA	
RDX	ND	NA	NA	
TETRYL	ND	NA	NA	
m-Nitrotoluene	ND	NA	NA	
Nitrobenzene	ND	NA	NA	
Nitroglycerin	ND	NA	NA	
HMX	ND	NA	NA	
o-Nitrotoluene	ND	NA	NA	
PETN	ND	NA	NA	
p-Nitrotoluene	ND	NA	NA	

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B090534 9
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 2/24/2011 Analysis Date (2): 2/25/2011

CMPNAM	Result(Col1)	Result(Col2)	%D	Q
1,3,5-Trinitrobenzene	12.18	24.45	67%	PG
1,3-Dinitrobenzene	ND	NA	NA	
2,4,6-Trinitrotoluene	ND	NA	NA	
2,4-Dinitrotoluene	ND	NA	NA	
2,6-Dinitrotoluene	ND	NA	NA	
2-Amino-4,6-dinitrotoluene	ND	NA	NA	
3,5-Dinitroaniline	ND	NA	NA	
4-Amino-2,6-dinitrotoluene	ND	NA	NA	
RDX	ND	NA	NA	
TETRYL	ND	NA	NA	
m-Nitrotoluene	ND	NA	NA	
Nitrobenzene	ND	NA	NA	
Nitroglycerin	ND	NA	NA	
HMX	26.79	210	155%	PG
o-Nitrotoluene	ND	NA	NA	
PETN	ND	NA	NA	
p-Nitrotoluene	ND	NA	NA	

9.86
CCV
9.76
9.74

5.17
CCV
5.22
5.21

NJ 28.93
CCV 28.95
28.95

NJ 42.90 CCV 42.88
due to raising base line in conf col 42.93

Sample Summary

TestAmerica West Sacramento Project Number G1B090534

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MD766	1	VEECA-4SMI03-0211	2/7/2011 09:30 AM	2/9/2011 08:50 AM
MD77K	2	VEECA-2SMI03-0211	2/7/2011 08:55 AM	2/9/2011 08:50 AM
MD77L	3	VEECA-2SMI04-0211	2/7/2011 10:55 AM	2/9/2011 08:50 AM
MD77P	4	VEECA-1SMI01-0211	2/7/2011 01:30 PM	2/9/2011 08:50 AM
MD77R	5	VEECA-1SMI02-0211	2/7/2011 12:45 PM	2/9/2011 08:50 AM
MD77T	6	VEECA-2SMI05-0211	2/7/2011 12:00 PM	2/9/2011 08:50 AM
MD77V	7	VEECA-1SMI01T-0211	2/7/2011 01:31 PM	2/9/2011 08:50 AM
MD77X	8	VEECA-1SMI01TT-0211	2/7/2011 01:32 PM	2/9/2011 08:50 AM
MD770	9	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD772	10	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD774	11	VEECA-4SMI05-0211	2/7/2011 10:10 AM	2/9/2011 08:50 AM
MD776	12	VEECA-EB01-020811-SMI	2/8/2011 07:30 AM	2/9/2011 08:50 AM
ME0HF	13	Grinding Blank #1	2/8/2011 07:30 AM	2/9/2011 08:50 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate — VEECA-1SMI01-0211
No ⊕

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 5:47 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI
Attachments: 8330 Form X.PDF; 8330 Form X.XLS; Cross Reference Summaries.pdf

Hi Laura,
Attached are The other forms you requested. We're providing both an excel summary and pdfs of the summary. I wasn't sure which would be easier for you to use. I've also provided a cross-reference summary as we're only showing the lab IDs on the forms. Please let me know if you need anything else.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:48	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

VR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.16	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	

19
20
21
22
23 For all lots analyzed on LC12.
24
25
26
27
28 MB 5/6/11
29
30
31

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/7-8/11
Received Date: 2/9/11
Prep Date: 2/22-23/11
Analysis Dates: 2/23-26/11
Cooler Temp: 1-3°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
~ RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

Contamination was noted in one of the method and/or grinding blanks - qualifications required. Associated QC blanks were: VEECA-EB01-020811-SMI (no positive results exhibited).

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Reporting Limit
Grinding Blank: G1B230000-375 extraction 2/23/10	perchlorate	0.45J ug/kg	5.0 ug/kg

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

Sample ID	Compound	Q Flag	Qual Code
VEECA-4SMI03-0211, VEECA-2SMI03-0211, VEECA-2SMI04-0211, VEECA-1SMI02-0211, VEECA-2SMI05-0211, VEECA-1SMI01T-0211, VEECA-4SMI05-0211	perchlorate	report RL with U	GBL

Laboratory Control Sample

All criteria were met. CRM (Certified Reference Material) was also included in this data package –results within criteria.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-1SMI02-0211-all criteria met.

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was submitted for VEECA-1SMI01-0211-no positive results were exhibited, no qualifications.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer Laura Mascellotti **Date:** 4/22/11

	YES	NO	N/A
A.I.I **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	✓	___
RAS/Non-RAS Case No.?	[___]	✓	___
SDG No.?	[✓]	___	___

		YES	NO	N/A
	Contract No.?	[ ]	✓	
	ACTION: If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.			
A.1.7.2	After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:			
	(a) all analytes analyzed by ICP-AES?		✓	
	(b) all analytes analyzed by ICP-MS?		✓	
	(c) Mercury?			✓
	(d) Cyanide?			✓
	ACTION: If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.			

A.1.8 **Raw Data**

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 **Digestion/Distillation Log**

Digestion Log for ICP-AES (Form XII)present?	✓ [ ]		
Digestion Log for ICP-MS (Form XII) present?	✓ [ ]		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓
Are pH values for metals and			

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments?			✓
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?		✓	
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?			✓
	Mercury analysis(28 days) exceeded?			
	Other Metals analysis(180 days)exceeded?		✓	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

		YES	NO	N/A
A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	✓		
	Cyanide Analysis ≥ 12?			✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	✓		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B090534

3/3, 1751

ICP - AES	
SAMPLE ID	VEECA-2SMI05-0211
ANALYTE	ZINC
Lab Value CONCENTRATION (mg/Kg)	31.4
AMOUNT FROM RAW DATA (ug/ml)	0.12554
SAMPLE SIZE (g)	0.999
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	31.416

ICP-MS	
SAMPLE ID	VEECA-4SMI03-0211
ANALYTE	selenium
Lab Value CONCENTRATION (mg/Kg)	1.1J
AMOUNT FROM RAW DATA (ug/L)	4.289674
SAMPLE SIZE (g)	0.994
FINAL VOLUME (L)	0.05
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	1.07889

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were required & performed but this was not noted on Form 1.

A.1.11 **Initial Calibration**

A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:			

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	___
	ICP-AES (more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[___]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

		YES	NO	N/A
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

		YES	NO	N/A
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B090534 Instrument Id: M01

Units: ug/L Datafile Name: 110224A1

Analyte	True Conc.	02/25/11 01:15 CCV 16 Found %REC	02/25/11 01:22 CCV 17 Found %REC	02/25/11 02:02 CCV 18 Found %REC
Arsenic	100	110.59 110.6	98.82 98.8	99.84 99.8
Selenium	100	122.89 122.9	100.00 100.0	100.24 100.2
Thallium	50	50.68 101.4	50.08 100.2	49.03 98.1

no quals - no samples assoc.

Lot Number: G1B090534 Instrument Id: M01

Units: ug/L Datafile Name: 110225B1

Analyte	True Conc.	02/25/11 12:06 ICV Found %REC
Arsenic	80	79.56 99.5
Selenium	80	82.49 103.1

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B090534 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 15:49 CCV 7 Found %REC		02/25/11 16:00 CCV 8 Found %REC		02/25/11 16:06 CCV 9 Found %REC	
Arsenic	100	99.60	99.6	113.50	113.5	99.28	99.3
Selenium	100	99.00	99.0	125.83	125.8	98.62	98.6

no quals
no samples assoc

Lot Number: G1B090534 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 16:38 CCV 10 Found %REC		02/25/11 16:44 CCV 11 Found %REC		02/25/11 17:25 CCV 12 Found %REC	
Arsenic	100	96.93	96.9	100.14	100.1	99.41	99.4
Selenium	100	97.51	97.5	99.70	99.7	99.69	99.7

Initial and Continuing Calibration Verification

		02/14/11 15:44 ICV4 Found %REC	02/14/11 15:46 ICV2A Found %REC
Manganese	0		
	1000	1032.3 103.2	
Nickel	0		
	1000	1027.8 102.8	
Potassium	0		106.41 0.0
	10000	9919.0 99.2	
Silver	0		
	250	245.38 98.2	
Sodium	10000	11718 117.2	
	25000		25416 101.7
Vanadium	0		
	1000	978.85 97.9	
Zinc	0		2.19 0.0
	1000	994.63 99.5	

J+ - EB01-020811-SM1

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/01/11 16:07 ICV4 Found %REC	03/01/11 16:09 ICV2A Found %REC
Magnesium	0		4.78 0.0
	10000	9783.8 97.8	
Manganese	0		
	1000	1026.6 102.7	
Nickel	0		
	1000	1025.1 102.5	
Potassium	0		98.00 0.0
	10000	9984.5 99.8	
Silver	0		
	250	241.62 96.6	
Sodium	10000	11713 117.1	
	25000		25513 102.1
Vanadium	0		
	1000	973.61 97.4	
Zinc	0		1.47 0.0
	1000	993.06 99.3	

no samples assoc.

Initial and Continuing Calibration Verification

		03/03/11 16:47 ICV4 Found %REC	03/03/11 16:49 ICV2A Found %REC
Lead	250	257.84 103.1	
Magnesium	0		3.46 0.0
	10000	9860.2 98.6	
Manganese	0		
	1000	1033.4 103.3	
Nickel	0		
	1000	1032.0 103.2	
Potassium	0		116.66 0.0
	10000	9963.1 99.6	
Silver	0		
	250	244.68 97.9	
Sodium	10000	11679 116.8	
	25000		25811 103.2
Vanadium	0		
	1000	986.19 98.6	
Zinc	0		2.44 0.0
	1000	1002.2 100.2	

J+ in all soils

Initial and Continuing Calibration Verification

		03/04/11 15:12 ICV4 Found	%REC	03/04/11 15:14 ICV2A Found	%REC
Lead	250	257.98	103.2		
Magnesium	0			1.42	0.0
	10000	9866.1	98.7		
Manganese	0				
	1000	1035.5	103.6		
Nickel	0				
	1000	1030.9	103.1		
Potassium	0			67.37	0.0
	10000	9972.4	99.7		
Silver	0				
	250	244.09	97.6		
Sodium	10000	11813	118.1		
	25000			26138	104.6
Vanadium	0				
	1000	980.51	98.1		
Zinc	0			2.49	0.0
	1000	998.35	99.8		

Na not reported from samples on this run

114

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

See next pages for quals rq'd.

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab method / SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:23 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B100574_LLQS.pdf; G1B050467_LLQS.pdf; G1B090534_LLQS.pdf; G1B230488_LLQS.pdf; G1B100573_LLQS.pdf

Jackie,
And here are the last 5 files of supplemental raw data for this issue.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTEN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

116

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? (unassoc stds.)	[✓]		
Mercury- 70 - 130%?	[ ]		✓
Cyanide - 70 - 130%?	[ ]		✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]		
Was an initial Calibration Blank analyzed after ICV?	[✓]		
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]		
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	✓	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".		SAC 42711	
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	___	[✓]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[___]	___	___
Each matrix type?	[___]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C030000223B
Lot Number:	G1B090534	**Lab WorkOrder:**	ME5MM
Matrix:	SOIL	**Lab Sample ID:**	G1C030000223B
Instrument Id:	T01	**Analysis Date/Time:**	3/3/2011 5:19:00PM
Units:	MG/KG		

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	7.7000	J	P
Chromium	0.5000	U	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	1.8000	J	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	25.0000	U	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

No Quals

No Quals

Result is less than the reporting limit. (RL)
Estimated Result. Result is less than RL.

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	BLK - G1C010000241B
Lot Number:	G1B090534	Lab WorkOrder:	ME111
Matrix:	WATER	Lab Sample ID:	G1C010000241B
Instrument Id:	T01	Analysis Date/Time:	3/1/2011 5:19:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	20.9000	J	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	250.0000	U	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

NoQuals

Result is less than the reporting limit. (RL)

Estimated Result. Result is less than RL.

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1B110000174B
Lot Number:	G1B090534	**Lab WorkOrder:**	MEA6X
Matrix:	WATER	**Lab Sample ID:**	G1B110000174B
Instrument Id:	T01	**Analysis Date/Time:**	2/14/2011 5:06:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	50.0000	U	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	110.0000	J	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

No Quals

U Result is less than the reporting limit (RL)

J Estimated Result. Result is less than RL.

164

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C010000287B
Lot Number:	G1B090534	**Lab WorkOrder:**	ME2A3
Matrix:	WATER	**Lab Sample ID:**	G1C010000287B
Instrument Id:	M02	**Analysis Date/Time:**	3/8/2011 1:31:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Selenium	2.5000	J	P

No Quals

U Result is less than the reporting limit. (RL)

J Estimated Result. Result is less than RL.

Estimated Result. Result is less than RL.

125

Form 3 Prep Blank Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	Grinding Blank #1
Lot Number:	G1B090534	Lab WorkOrder:	MF0HF
Matrix:	WATER	Lab Sample ID:	G1B090534013
% Solids:	0.0	Date/Time Collected:	02/08/11 7:30
Units:	UG/L	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method	
7429-90-5	Aluminum	52.4000	J		P	
7440-36-0	Antimony	20.0000	U		P	
7440-38-2	Arsenic	10.0000	U		P	
7440-39-3	Barium	5.0000	U		P	
7440-41-7	Beryllium	1.0000	U		P	
7440-43-9	Cadmium	1.0000	U		P	
7440-70-2	Calcium	717.0000			P	NQ
7440-47-3	Chromium	5.0000	U		P	
7440-48-4	Cobalt	5.0000	U		P	
7440-50-8	Copper	2.1000	J		P	NQ
7439-89-6	Iron	50.0000	U		P	
7439-92-1	Lead	5.0000	U		P	
7439-95-4	Magnesium	162.0000	J		P	NQ
7439-96-5	Manganese	5.0000	U		P	
7440-02-0	Nickel	5.0000	U		P	
7440-09-7	Potassium	272.0000	J		P	✓ J in several
7782-49-2	Selenium	12.5000	U		P	
7440-22-4	Silver	2.0000	U		P	
7440-23-5	Sodium	528.0000	J		P	✓ J in several
7440-28-0	Thallium	5.0000	U		P	
7440-62-2	Vanadium	5.0000	U		P	
7440-66-6	Zinc	10.0000	U		P	

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

Form 1 Analysis Data Sheet Equivalent

1 of 6

CH2M Hill Inc

Client Sample ID: Grinding Blank #1

General Chemistry

Lot-Sample #...: G1B090534-013 Work Order #...: ME0HF Matrix.....: WATER
Date Sampled...: 02/08/11 07:30 Date Received..: 02/09/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/26/11	1059291

Dilution Factor: 1 Analysis Time..: 17:29 DL.....: 2.0

161

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			

A.1.16 **ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV**

NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg.

A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every ~~20~~ analytical samples? beginning only	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[___]	___	___

ACTION:
If no, flag as estimated (J) all sample results.

A.1.16.2 **ICP-AES Method**

A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated only sample results ≥MDL

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

	YES	NO	N/A
A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

CH2M Hill Inc

Interference Check Standard AB

Instrument Id: M02

Lot Number: G1B090534

Datafile Name: 110304A2

Units: ug/L

Analyte	Spike Amount	ICSAB 03/04/11 10:06	
		Found	%REC
Arsenic	100	100.66	100.7
Selenium	100	99.97	100.0
Thallium	50	49.22	98.4

Instrument Id: M02

Lot Number: G1B090534

Datafile Name: 110306A2

Units: ug/L

Analyte	Spike Amount	ICSAB 03/06/11 09:45		ICSAB 03/06/11 09:58	
		Found	%REC	Found	%REC
Arsenic	100	32.32	32.3	104.74	104.7
Selenium	100	33.44	33.4	111.73	111.7
Thallium	50	14.82	29.6	46.87	93.7

no quals –
std rerun immediately
all criteria was met

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[___]	✓	___

one std exhibited low recoveries but was rerun & all criteria were met.

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

A.1.17.1 Was Matrix Spike analysis performed:

	YES	NO	N/A
For each matrix type?	[___] ✓	___	___
For each SDG?	[___]	___	___
On one of the SDG samples?	[___]	___	___
For each concentration range (i.e., low, med., high)?	[___]	___	___
For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[___]	___	___
Was a spiked sample prepared and analyzed with the SDG samples?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	___	✓
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%)flagged with Lab Qualifier "N" on Form I's and Form VA?	[___]	___	✓
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	___
	ACTION: If the matrix spike recovery is less than 30%,reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEFCA-4SM03-0211
Lot Number:	G1B090534	**MS Lab Workorder:**	MD766 - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B090534001D
% Solids	100.0	**QC Batch ID:**	1062223
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	21500.0000	N	18700.0000		101.0000	2800.0	N	P	NQ*
Antimony	80 - 120	8.1800	N	10.0000		25.2000	28.0	N	P	J/UJ
Barium	80 - 120	131.0000		38.8000		101.0000	91.0		P	
Beryllium	80 - 120	2.4500		0.2100	J	2.5200	89.0		P	
Cadmium	80 - 120	2.4400		0.2800	J	2.5200	86.0		P	
Calcium	80 - 120	86100.0000	N	78300.0000	B	2520.0000	309.0	N	P	NQ*
Chromium	80 - 120	60.9000	N	47.7000		10.8000	122.0	N	P	J+
Cobalt	80 - 120	34.2000		11.4000		25.2000	90.0		P	
Copper	80 - 120	33.5000		21.6000		12.6000	94.0		P	
Iron	80 - 120	25000.0000	N	23800.0000	B	50.4000	2500.0	N	P	NQ*
Lead	80 - 120	23.0000		2.5000		25.2000	87.0		P	
Magnesium	80 - 120	9360.0000		6900.0000		2520.0000	98.0		P	
Manganese	80 - 120	851.0000	N	832.0000		25.2000	78.0	N	P	NQ*
Nickel	80 - 120	35.3000		12.8000		25.2000	90.0		P	
Potassium	80 - 120	5690.0000		3270.0000		2520.0000	96.0		P	
Silver	75 - 120	2.2500		1.0000		2.5200	86.0		P	
Sodium	80 - 120	2770.0000		384.0000	J	2520.0000	95.0		P	
Vanadium	80 - 120	93.8000		66.2000		25.2000	109.0		P	
Zinc	80 - 120	55.1000		33.5000		25.2000	86.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance
No Quals

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VBECA-4SMI03-0211
Lot Number:	G1B090534	**MS Lab Workorder:**	MD766 - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B0905340015
% Solids	100.0	**QC Batch ID:**	1062223
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	22300.0000	N	18700.0000		101.0000	3590.0	N	P	NQ*
Antimony	80 - 120	8.1600	N	10.0000		25.2000	28.0	N	P	J/UJ
Barium	80 - 120	131.0000		38.8000		101.0000	92.0		P	
Beryllium	80 - 120	2.4900		0.2100	J	2.5200	91.0		P	
Cadmium	80 - 120	2.5400		0.2800	J	2.5200	90.0		P	
Calcium	80 - 120	87300.0000	N	78300.0000	B	2520.0000	356.0	N	P	NQ*
Chromium	80 - 120	62.5000	N	47.7000		10.6000	139.0	N	P	J+
Cobalt	80 - 120	34.5000		11.4000		25.2000	92.0		P	
Copper	80 - 120	34.2000		21.6000		12.6000	100.0		P	
Iron	80 - 120	25800.0000	N	23800.0000	B	50.3000	4120.0	N	P	NQ*
Lead	80 - 120	23.0000		2.5000		25.2000	88.0		P	
Magnesium	80 - 120	9620.0000		6900.0000		2520.0000	108.0		P	
Manganese	80 - 120	865.0000	N	832.0000		25.2000	131.0	N	P	NQ*
Nickel	80 - 120	35.8000		12.8000		25.2000	92.0		P	
Potassium	80 - 120	5850.0000		3270.0000		2520.0000	103.0		P	
Silver	75 - 120	2.3400		1.0000		2.5200	90.0		P	
Sodium	80 - 120	2810.0000		384.0000	J	2520.0000	97.0		P	
Vanadium	80 - 120	96.0000		66.2000		25.2000	118.0		P	
Zinc	80 - 120	56.9000		33.5000		25.2000	93.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance
No Quals

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SM103-0211
Lot Number:	G1B090534	**MS Lab Workorder:**	MD766 - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B0905340015
% Solids	100.0	**QC Batch ID:**	1061277
Units:	MG/KG	**Instrument ID:**	M02

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Arsenic	80 - 120	14.0000	N	6.1000		10.0000	79.0	N	P
Selenium	80 - 120	8.9600	N	1.1000	J	10.0000	79.0	N	P
Thallium	80 - 120	2.3500		0.5000		2.5000	90.0		P

NQ *
NQ

N Spike sample recovery is outside control limits.

* MSD - OK no quals

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI03-0211
Lot Number:	G1B090534	**MS Lab Workorder:**	MD766 - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B090534001D
% Solids	100.0	**QC Batch ID:**	1061277
Units:	MG/KG	**Instrument ID:**	M02

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Arsenic	80 - 120	14.9000		6.1000		10.2000	86.0		P
Selenium	80 - 120	9.6000		1.1000	J	10.2000	83.0		P
Thallium	80 - 120	2.4300		0.5000		2.5500	92.0		P

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(NOTE:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	* ✓	[___]	___
* out due to abundance no quals			
ACTION: If yes for any of the above, proceed as follows:			
If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (NOTE:Replace "N" with "J" or "R" as appropriate.)			
A.1.18 **Lab Duplicates) - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD RPD's calc.

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	___

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.
NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[___] ✓	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "x" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	___

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			

Soil/Sediment Field Duplicates

A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "x" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

Field triplicate assessed see next page.

A.1.19.5	Circle on each Appendix A.4 all values that have: RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-1SMI01-0211
Duplicate Sample ID: VEECA-1SMI01T-0211
Triplicate Sample ID: VEECA-1SMI01TT-0211

Water: RSD>30%
Soil: RSD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	540	575	508	33.51	541.00	6%
barium	7	7.1	6.6	0.26	6.90	4%
beryllium				#DIV/0!	#DIV/0!	#DIV/0!
cadmium				#DIV/0!	#DIV/0!	#DIV/0!
calcium	315000	315000	300000	8660.25	310000.00	3%
chromium	6.9	6.9	6.4	0.29	6.73	4%
cobalt				#DIV/0!	#DIV/0!	#DIV/0!
copper	1.1	2.5	2.5	0.81	2.03	40%
iron	752	763	695	36.50	736.67	5%
lead				#DIV/0!	#DIV/0!	#DIV/0!
magnesium	15000	15000	14400	346.41	14800.00	2%
manganese	27.9	29.7	26.4	1.65	28.00	6%
nickel				#DIV/0!	#DIV/0!	#DIV/0!
potassium	169	165	156	6.66	163.33	4%
sodium	2530	2520	2420	60.83	2490.00	2%
vanadium	3.9	3.9	3.6	0.17	3.80	5%
zinc				#DIV/0!	#DIV/0!	#DIV/0!
arsenic	3	3	1.7	0.75	2.57	29%
thallium				#DIV/0!	#DIV/0!	#DIV/0!
selenium	2	1.4	2.2	0.42	1.87	22%

COMMENTS: No qualifications required.- copper results are non-detect in dup & trip and <LOD in native.

LAB DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI05-0211 (10)
Duplicate Sample ID: VEECA-4SMI05-0211 (11)

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	20900	21400	2
arsenic	7.9	7.9	0
barium	33.9	35.8	5
beryllium	0.25	0.25	0
cadmium	0.2	0.22	10
calcium	63900	65100	2
chromium	37.3	37.9	2
cobalt	12	12.7	6
copper	24.8	24.8	0
iron	26900	27300	1
lead	2.1	1.7	21
magnesium	7510	7660	2
manganese	723	740	2
nickel	13.1	13.4	2
potassium	3550	3610	2
selenium	1.4	1	33
sodium	269	275	2
vanadium	71.1	72.5	2
zinc	39.2	40	2

COMMENTS: Lab designated lab dup - not used to qualify samples - no impact on reported results.

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	**Client Sample ID:**	VEECA-4SM005-0211
Lot Number:	G1B090534	**Lab WorkOrder:**	MD774
Matrix:	SOIL	**Lab Sample ID:**	G1B090534011
% Solids:	100.0	**Date/Time Collected:**	02/07/11 10:10
Units:	MG/KG	**Date/Time Received:**	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	21400.0000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	7.9000			P
7440-39-3	Barium	35.8000			P
7440-41-7	Beryllium	0.2500	J		P
7440-43-9	Cadmium	0.2200	J		P
7440-70-2	Calcium	65100.0000	B		P
7440-47-3	Chromium	37.9000			P
7440-48-4	Cobalt	12.7000			P
7440-50-8	Copper	24.8000			P
7439-89-6	Iron	27300.0000	B		P
7439-92-1	Lead	1.7000	J		P
7439-95-4	Magnesium	7660.0000			P
7439-96-5	Manganese	740.0000			P
7440-02-0	Nickel	13.4000			P
7440-09-7	Potassium	3610.0000			P
7782-49-2	Selenium	1.0000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	275.0000	J		P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	72.5000			P
7440-66-6	Zinc	40.0000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/2011

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENTO	Client Sample ID:	VEECA-4SMI05-0211
Lot Number:	G1B090534	Lab WorkOrder:	MD772
Matrix:	SOIL	Lab Sample ID:	G1B090534010
% Solids:	100.0	Date/Time Collected:	02/07/11 10:10
Units:	MG/KG	Date/Time Received:	02/09/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	20900.0000			P
7440-36-0	Antimony	18.0000	U		P
7440-38-2	Arsenic	7.9000			P
7440-39-3	Barium	33.9000			P
7440-41-7	Beryllium	0.2500	J		P
7440-43-9	Cadmium	0.2900	J		P
7440-70-2	Calcium	63900.0000	B		P
7440-47-3	Chromium	37.3000			P
7440-48-4	Cobalt	12.0000			P
7440-50-8	Copper	24.8000			P
7439-89-6	Iron	26900.0000	B		P
7439-92-1	Lead	2.1000	J		P
7439-95-4	Magnesium	7510.0000			P
7439-96-5	Manganese	723.0000			P
7440-02-0	Nickel	13.1000			P
7440-09-7	Potassium	3558.0000			P
7782-49-2	Selenium	1.4000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	269.0000	J		P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	71.1000			P
7440-66-6	Zinc	39.2000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/26/11

Form I Analysis Data Sheet Equivalent

147

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS)- Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

ICP SERIAL DILUTIONS

Lab Name:	TestAmerica West Sacramento	MS Lab Workorder:	MD766P25
Lot Number:	G1B090534	MS Lab Sample ID:	G1B090534001
Matrix:	SOIL	QC Batch ID:	1061277
Instrument Id:	M02	Analysis Date/Time:	3/6/2011 11:14:49AM
Concentration Units:	UG/L	Method:	6020

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M
Arsenic	122.1884		138.3681		13.24	E	P
Selenium	21.4485		36.5319	J	70.32		P
Thallium	1.8584	U	2.7398	U			P

NQ

criteria doesnt apply because results in sample are <50 LOQ. Per DODQSM 4.1

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___

not for analytes for which criteria applies

ACTION:
If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.

(**NOTE**:Replace "E" with "J" or "R" as appropriate.)

A.1.22 **Total/Dissolved or Inorganic/Total Analytes**

A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓

ACTION:
If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled:

(1) The dissolved(or inorganic)concentration is greater than total concentration, and
(2) greater than or equal to 5xMDL.

A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓
	ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.			
A.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓
	ACTION: If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results) greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.			
	If the Field Blank value is less than the			

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[___]	___	✓
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[___]	✓	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[✓]	___	___
Was the %RI for the two fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[✓]	___	___

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter

some dilutions were required due to MI

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/7-2/8
Received Date: 2/9, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/26 soils, no prep. for waters
Analysis Dates: 2/26 soils, 2/9 for waters

All holding time requirements were met with the following exception. Sample VEECA-EB01-020811-SMI exceeded the 24 hour holding time by approximately 7 hours. The reported result was qualified as estimated J/UJ with a qualifier code of HT.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-4SMI03-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID: NONE

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. A field triplicate was assessed. No positive results were reported for the target analyte. Three samples were reported at an elevated reporting limit due to observed matrix interference. This result was flagged with a G flag by the laboratory. This flag was crossed out and the results were reported unqualified in the final DV report. Clarification of the calculations was requested from the laboratory.

Reviewer ACleveland **Date:** 4/27/11

Hexavalent Chromium Calcs - ICAL soils - 3/1/11

X - Response	Y - Concentration (mg/L)
0	0
0.004	0.005
0.008	0.01
0.02	0 025
0.04	0.05
0.079	0.1

slope, m (A1) =	1.264884793
y-int, (A0) =	-0.000166267
r =	0.999979231
Rr2=	0.999958462

VEECA-4SMI03-0211 MS Lab Value - 0.248 mg/Kg

Response = 0.04

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.050429124 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.12
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.24841933 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B100573, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B100573. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Exp	Perc	TMetals 6010B	DMetals 6010B	TMetals 6020	DMetals 6020	THxCr	DHxCr
VECCA-5SW01-0211	G1B00573-001	water	X							
VEECA-5SW02-0211	G1B100573-002	water	X	X	X	X	X	X	X	X
VEECA-5SW02P-0211	G1B100573-003	water	X	X	X	X	X	X	X	X
VEECA-5SW03-0211	G1B100573-004	water	X	X	X	X	X	X	X	X
VEECA-EB020911-SW	G1B100573-005	water	X	X	X	X	X	X	X	X
VEECA-5SW04-0211	G1B100573-006	water	X	X	X	X	X	X	X	X
VEECA-5SW05-0211	G1B100573-007	water	X	X	X	X	X	X	X	X
VEECA-EB01-020911SD	G1B100573-008	water	X	X	X		X		X	
VEECA-5SW04-0211 MS	G1B100573-006MS	water	X	X	X	X	X	X	X	X
VEECA-5SW04-0211 MSD	G1B100573-006MSD	water	X	X	X	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB020911-SW and VEECA-EB01-020911SD-equipment blanks; and sample VEECA-5SW02P-0211-field duplicate of sample VEECA-5SW02-0211.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times

- HPLC Performance *
- ICP MS Tuning *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- LLQ Standards *
- Blanks *
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions *
- Field Duplicates *
- Field Triplicates NA
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications were required to the data.

Perchlorate

No qualifications were required to the data.

Total & Dissolved Metals

One of the ICV standards associated with the samples exhibited a recovery above the upper QC limit of 110% at 115.1%. Qualifications were required.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Qualifications to the data were required.

Two samples exhibited differences between the total and dissolved results that were >50%. One analyte in each pair of samples required rejection based on Region II guidelines.

Total & Dissolved Hexavalent Chromium

All of the sample analyses exceeded the required 24-hour holding time but all were analyzed less than 48 hours out; therefore the reported results were qualified as estimated.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the perchlorate fraction as pages were missing from the submitted data package. The laboratory was contacted and the requested information was supplied. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/9/11 and samples were received at the laboratory on 2/10/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Total & Dissolved Hexavalent Chromium

All samples exceeded the 24 hour holding time by approximately 30 hours. All reported results in the samples were qualified as estimated J/UJ with a qualifier code of HT.

Matrix Spike Recoveries

Total & Dissolved Metals

The matrix spike pairs submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-5SW04-0211 Total	aluminum	all total field samples	133/132	J+	MSH
VEECA-5SW04-0211 Dissolved	vanadium	all dissolved field samples	124/126	J+	MSH

Identification/Quantitation

Total & Dissolved Metals

The sample pairs listed in the following table exhibited one analyte each that had %Ds between the total and dissolved results that were greater than 50% when the dissolved result was higher than the total result and the dissolved result was greater than 5X the DL. Qualifications were required as noted based on Region II guidelines.

Total / Dissolved Pair ID	Analyte	%D	Qualifier	Q Code
VEECA-5SW04-0211 Total VEECA-5SW04-0211 Dissolved	nickel	121	R	OT
VEECA-5SW05-0211 Total VEECA-5SW05-0211 Dissolved	selenium	632	R	OT

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B100573

Summary of Data Qualifications

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Total & Dissolved Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	sodium	+	J	CCH
all total metals field samples	aluminum	+	J	MSH
all dissolved metals field samples	vanadium	+	J	MSH
VEECA-5SW04-0211 Total, VEECA-5SW04-0211 Dissolved	nickel	+	R	OT
VEECA-5SW05-0211 Total, VEECA-5SW05-0211 Dissolved	selenium	+	R	OT

Total & Dissolved Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
all samples	hexavalent chromium	+/-	J/UJ	HT

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

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

HPLC

Lot-Sample #...: G1B100573-001 Work Order #...: MEAFP1AD Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/23/11
Prep Batch #...: 1042184 Analysis Time..: 22:54
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.050 U	0.50	ug/L	0.025
1,3,5-Trinitrobenzene	0.050 U	0.099	ug/L	0.031
1,3-Dinitrobenzene	0.050 U	0.15	ug/L	0.050
2,4,6-Trinitrotoluene	0.050 U	0.15	ug/L	0.050
2,4-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2,6-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2-Amino-4,6-dinitrotoluene	0.099 U	0.30	ug/L	0.099
2-Nitrotoluene	0.099 U	0.99	ug/L	0.087
3-Nitrotoluene	0.099 U	0.50	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.050 U	0.15	ug/L	0.050
4-Nitrotoluene	0.099 U	0.99	ug/L	0.087
HMX	0.050 U	0.15	ug/L	0.036
Nitrobenzene	0.050 U	0.15	ug/L	0.050
Nitroglycerin	0.50 U	0.99	ug/L	0.33
PETN	0.50 U	0.99	ug/L	0.30
RDX	0.050 U	0.25	ug/L	0.036
Tetryl	0.050 U	0.15	ug/L	0.050

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(84 - 125)

051111

009

CH2M Hill Inc

Client Sample ID: VEECA-5SW02-0211

HPLC

Lot-Sample #...: G1B100573-002 Work Order #...: MEAFQ1AN Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/23/11
Prep Batch #...: 1042184 Analysis Time..: 23:37
Dilution Factor: 1.01
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.050 U	0.50	ug/L	0.025
1,3,5-Trinitrobenzene	0.050 U	0.10	ug/L	0.031
1,3-Dinitrobenzene	0.050 U	0.15	ug/L	0.050
2,4,6-Trinitrotoluene	0.050 U	0.15	ug/L	0.050
2,4-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2,6-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2-Amino-4,6-dinitrotoluene	0.10 U	0.30	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.089
3-Nitrotoluene	0.10 U	0.50	ug/L	0.058
4-Amino-2,6-dinitrotoluene	0.050 U	0.15	ug/L	0.050
4-Nitrotoluene	0.10 U	1.0	ug/L	0.089
HMX	0.050 U	0.15	ug/L	0.036
Nitrobenzene	0.050 U	0.15	ug/L	0.050
Nitroglycerin	0.50 U	1.0	ug/L	0.33
PETN	0.50 U	1.0	ug/L	0.30
RDX	0.050 U	0.25	ug/L	0.036
Tetryl	0.050 U	0.15	ug/L	0.050

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(84 - 125)

WM 051111

010

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

HPLC

Lot-Sample #...: G1B100573-003 Work Order #...: MEAFR1AN Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 00:20
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.050 U	0.50	ug/L	0.025
1,3,5-Trinitrobenzene	0.050 U	0.10	ug/L	0.031
1,3-Dinitrobenzene	0.050 U	0.15	ug/L	0.050
2,4,6-Trinitrotoluene	0.050 U	0.15	ug/L	0.050
2,4-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2,6-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2-Amino-4,6-dinitrotoluene	0.10 U	0.30	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.088
3-Nitrotoluene	0.10 U	0.50	ug/L	0.057
4-Amino-2,6-dinitrotoluene	0.050 U	0.15	ug/L	0.050
4-Nitrotoluene	0.10 U	1.0	ug/L	0.088
HMX	0.050 U	0.15	ug/L	0.036
Nitrobenzene	0.050 U	0.15	ug/L	0.050
Nitroglycerin	0.50 U	1.0	ug/L	0.33
PETN	0.50 U	1.0	ug/L	0.30
RDX	0.050 U	0.25	ug/L	0.036
Tetryl	0.050 U	0.15	ug/L	0.050

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(84 - 125)

WM
05/11/11

D11

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

HPLC

Lot-Sample #...: G1B100573-004 Work Order #...: MEAFT1AN Matrix.....: WATER
Date Sampled...: 02/09/11 10:55 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 01:03
Dilution Factor: 1.04

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.052 U	0.52	ug/L	0.026
1,3,5-Trinitrobenzene	0.052 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.052 U	0.16	ug/L	0.052
2,4,6-Trinitrotoluene	0.052 U	0.16	ug/L	0.052
2,4-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2,6-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.092
3-Nitrotoluene	0.10 U	0.52	ug/L	0.059
4-Amino-2,6-dinitrotoluene	0.052 U	0.16	ug/L	0.052
4-Nitrotoluene	0.10 U	1.0	ug/L	0.092
HMX	0.052 U	0.16	ug/L	0.037
Nitrobenzene	0.052 U	0.16	ug/L	0.052
Nitroglycerin	0.52 U	1.0	ug/L	0.34
PETN	0.52 U	1.0	ug/L	0.31
RDX	0.052 U	0.26	ug/L	0.037
Tetryl	0.052 U	0.16	ug/L	0.052

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(84 - 125)

WM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911-SW

HPLC

Lot-Sample #...: G1B100573-005 Work Order #...: MEAFV1AN Matrix.....: WATER
Date Sampled...: 02/09/11 07:00 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 02:29
Dilution Factor: 1.18

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.059 U	0.59	ug/L	0.030
1,3,5-Trinitrobenzene	0.059 U	0.12	ug/L	0.037
1,3-Dinitrobenzene	0.059 U	0.18	ug/L	0.059
2,4,6-Trinitrotoluene	0.059 U	0.18	ug/L	0.059
2,4-Dinitrotoluene	0.059 U	0.18	ug/L	0.059
2,6-Dinitrotoluene	0.059 U	0.18	ug/L	0.059
2-Amino-4,6-dinitrotoluene	0.12 U	0.35	ug/L	0.12
2-Nitrotoluene	0.12 U	1.2	ug/L	0.10
3-Nitrotoluene	0.12 U	0.59	ug/L	0.067
4-Amino-2,6-dinitrotoluene	0.059 U	0.18	ug/L	0.059
4-Nitrotoluene	0.12 U	1.2	ug/L	0.10
HMX	0.059 U	0.18	ug/L	0.042
Nitrobenzene	0.059 U	0.18	ug/L	0.059
Nitroglycerin	0.59 U	1.2	ug/L	0.39
PETN	0.59 U	1.2	ug/L	0.35
RDX	0.059 U	0.30	ug/L	0.042
Tetryl	0.059 U	0.18	ug/L	0.059

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(84 - 125)

MM 051111

013

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211

HPLC

Lot-Sample #...: G1B100573-006 Work Order #...: MEAFW1AN Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 03:12
Dilution Factor: 1.04
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.052 U	0.52	ug/L	0.026
1,3,5-Trinitrobenzene	0.052 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.052 U	0.16	ug/L	0.052
2,4,6-Trinitrotoluene	0.052 U	0.16	ug/L	0.052
2,4-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2,6-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.092
3-Nitrotoluene	0.10 U	0.52	ug/L	0.059
4-Amino-2,6-dinitrotoluene	0.052 U	0.16	ug/L	0.052
4-Nitrotoluene	0.10 U	1.0	ug/L	0.092
HMX	0.052 U	0.16	ug/L	0.037
Nitrobenzene	0.052 U	0.16	ug/L	0.052
Nitroglycerin	0.52 U	1.0	ug/L	0.34
PETN	0.52 U	1.0	ug/L	0.31
RDX	0.052 U	0.26	ug/L	0.037
Tetryl	0.052 U	0.16	ug/L	0.052

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	92	(84 - 125)

WM 05/11/11

014

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211

HPLC

Lot-Sample #...: G1B100573-007 Work Order #...: MEAFX1AN Matrix.....: WATER
Date Sampled...: 02/09/11 12:30 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 05:20
Dilution Factor: 1.02
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.051 U	0.51	ug/L	0.026
1,3,5-Trinitrobenzene	0.051 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.051 U	0.15	ug/L	0.051
2,4,6-Trinitrotoluene	0.051 U	0.15	ug/L	0.051
2,4-Dinitrotoluene	0.051 U	0.15	ug/L	0.051
2,6-Dinitrotoluene	0.051 U	0.15	ug/L	0.051
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.090
3-Nitrotoluene	0.10 U	0.51	ug/L	0.058
4-Amino-2,6-dinitrotoluene	0.051 U	0.15	ug/L	0.051
4-Nitrotoluene	0.10 U	1.0	ug/L	0.090
HMX	0.051 U	0.15	ug/L	0.037
Nitrobenzene	0.051 U	0.15	ug/L	0.051
Nitroglycerin	0.51 U	1.0	ug/L	0.34
PETN	0.51 U	1.0	ug/L	0.31
RDX	0.051 U	0.26	ug/L	0.037
Tetryl	0.051 U	0.15	ug/L	0.051

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(84 - 125)

MM 03/11/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SD

HPLC

Lot-Sample #...: G1B100573-008 Work Order #...: MEA3X1AD Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 06:03
Dilution Factor: 1.05
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.052 U	0.52	ug/L	0.026
1,3,5-Trinitrobenzene	0.052 U	0.10	ug/L	0.033
1,3-Dinitrobenzene	0.052 U	0.16	ug/L	0.052
2,4,6-Trinitrotoluene	0.052 U	0.16	ug/L	0.052
2,4-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2,6-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2-Amino-4,6-dinitrotoluene	0.10 U	0.32	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.092
3-Nitrotoluene	0.10 U	0.52	ug/L	0.060
4-Amino-2,6-dinitrotoluene	0.052 U	0.16	ug/L	0.052
4-Nitrotoluene	0.10 U	1.0	ug/L	0.092
HMX	0.052 U	0.16	ug/L	0.038
Nitrobenzene	0.052 U	0.16	ug/L	0.052
Nitroglycerin	0.52 U	1.0	ug/L	0.35
PETN	0.52 U	1.0	ug/L	0.32
RDX	0.052 U	0.26	ug/L	0.038
Tetryl	0.052 U	0.16	ug/L	0.052

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(84 - 125)

WM 05/11

016

CH2M Hill Inc

Client Sample ID: VEECA-5SW02-0211

Dissolved HPLC

Lot-Sample #...: G1B100573-002 Work Order #...: MEAFQ2AM Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11
Prep Date.....: 02/22/11 Analysis Date..: 02/22/11
Prep Batch #...: 1053108 Analysis Time..: 22:24
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042211

017

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

Dissolved HPLC

Lot-Sample #...: G1B100573-003 **Work Order #...:** MEAFR2AM **Matrix.....:** WATER
Date Sampled...: 02/09/11 10:10 **Date Received..:** 02/10/11
Prep Date.....: 02/22/11 **Analysis Date..:** 02/22/11
Prep Batch #...: 1053108 **Analysis Time..:** 22:42
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

LM
04/22/11

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

Dissolved HPLC

Lot-Sample #...: G1B100573-004 Work Order #...: MEAFT2AM Matrix.....: WATER
Date Sampled...: 02/09/11 10:55 Date Received..: 02/10/11
Prep Date.....: 02/22/11 Analysis Date..: 02/22/11
Prep Batch #...: 1053108 Analysis Time..: 23:17
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 04/22/11

019

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911-SW

Dissolved HPLC

Lot-Sample #...: G1B100573-005 **Work Order #...:** MEAFV2AM **Matrix.....:** WATER
Date Sampled...: 02/09/11 07:00 **Date Received..:** 02/10/11
Prep Date.....: 02/22/11 **Analysis Date..:** 02/22/11
Prep Batch #...: 1053108 **Analysis Time..:** 23:34
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

WM 2/22/11

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211

Dissolved HPLC

Lot-Sample #...: G1B100573-006 Work Order #...: MEAFW2AM Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11
Prep Date.....: 02/22/11 Analysis Date..: 02/22/11
Prep Batch #...: 1053108 Analysis Time..: 23:52
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

WM 02/22/11

021

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211

Dissolved HPLC

Lot-Sample #...:	G1B100573-007	**Work Order #...:**	MEAFX2AM	**Matrix.....:**	WATER
Date Sampled...:	02/09/11 12:30	**Date Received..:**	02/10/11		
Prep Date.....:	02/22/11	**Analysis Date..:**	02/23/11		
Prep Batch #...:	1053108	**Analysis Time..:**	00:44		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

LM 042211

022

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SD

Dissolved HPLC

Lot-Sample #...:	G1B100573-008	**Work Order #...:**	MEA3X2AC	**Matrix.....:**	WATER
Date Sampled...:	02/09/11 07:20	**Date Received..:**	02/10/11		
Prep Date.....:	02/22/11	**Analysis Date..:**	02/23/11		
Prep Batch #...:	1053108	**Analysis Time..:**	01:01		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

WM 042211

023

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-5SW01-0211
Lot Number:	G1B100573	Lab WorkOrder:	MEAFP
Matrix:	WATER	Lab Sample ID:	G1B100573001
% Solids:	0.0	Date/Time Collected:	02/09/11 9:25
Units:	UG/L	Date/Time Received:	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2740.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	J		P
7440-39-3	Barium	72.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	622000.00			P
7440-47-3	Chromium	4.8000	J		P
7440-48-4	Cobalt	3.1000			P
7440-50-8	Copper	12.0000			P
7439-89-6	Iron	2060.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	708000.00			P
7439-96-5	Manganese	73.0000	J		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	193000.00			P
7782-49-2	Selenium	17.0000			P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5710000.0		J CCH	P
7440-28-0	Thallium	0.5400	J		P
7440-62-2	Vanadium	14.0000			P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JLC 4/26/11

024

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-5SW01-0211
Lot Number:	G1B100573	Lab WorkOrder:	MEAFP
Matrix:	WATER	Lab Sample ID:	G1B100573001
% Solids:	0.0	Date/Time Collected:	02/09/11 9:25
Units:	UG/L	Date/Time Received:	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	63.9000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	560000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.9000	J		P
7440-50-8	Copper	10.0000			P
7439-89-6	Iron	85.9000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	661000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	2.3000	J		P
7440-09-7	Potassium	180000.00			P
7782-49-2	Selenium	27.0000	J		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5270000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.1000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW02-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFQ
Matrix:	WATER	**Lab Sample ID:**	G1B100573002
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1960.0000	~~J~~	J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.5000	J		P
7440-39-3	Barium	67.6000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	591000.00			P
7440-47-3	Chromium	4.2000	J		P
7440-48-4	Cobalt	2.8000	J		P
7440-50-8	Copper	11.8000			P
7439-89-6	Iron	1700.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	686000.00			P
7439-96-5	Manganese	56.5000	J		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	184000.00			P
7782-49-2	Selenium	2.2000	J		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5570000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.1000			P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/26/11

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW02-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFQ
Matrix:	WATER	**Lab Sample ID:**	G1B100573002
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	64.7000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	576000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	10.3000			P
7439-89-6	Iron	62.7000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	686000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	1.2000	J		P
7440-09-7	Potassium	184000.00			P
7782-49-2	Selenium	7.2000			P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5620000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.4000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/26/11

027

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW02P-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFR
Matrix:	WATER	**Lab Sample ID:**	G1B100573003
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2040.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.5000	J		P
7440-39-3	Barium	67.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	597000.00			P
7440-47-3	Chromium	5.3000			P
7440-48-4	Cobalt	2.7000	J		P
7440-50-8	Copper	10.7000			P
7439-89-6	Iron	1950.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	683000.00			P
7439-96-5	Manganese	57.1000	J		P
7440-02-0	Nickel	3.6000			P
7440-09-7	Potassium	186000.00			P
7782-49-2	Selenium	2.9000	J		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5570000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	11.7000	J		P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

028

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW02P-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFR
Matrix:	WATER	**Lab Sample ID:**	G1B100573003
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	61.8000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	555000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	10.2000			P
7439-89-6	Iron	72.3000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	656000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	178000.00			P
7782-49-2	Selenium	26.2000	J		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5440000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.5000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

029

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW03-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFT
Matrix:	WATER	**Lab Sample ID:**	G1B100573004
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:55
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2990.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.7000	J		P
7440-39-3	Barium	72.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	612000.00			P
7440-47-3	Chromium	7.5000			P
7440-48-4	Cobalt	3.0000			P
7440-50-8	Copper	11.5000			P
7439-89-6	Iron	2530.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	699000.00			P
7439-96-5	Manganese	77.5000	J		P
7440-02-0	Nickel	1.5000	J		P
7440-09-7	Potassium	190000.00			P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5650000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.9000			P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit (RL)

J Estimated result. Result is less than RL.

JAC 4/26/11

030

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW03-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFT
Matrix:	WATER	**Lab Sample ID:**	G1B100573004
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:55
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	62.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	551000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	10.2000			P
7439-89-6	Iron	49.7000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	652000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	1.5000	J		P
7440-09-7	Potassium	177000.00			P
7782-49-2	Selenium	12.8000			P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5230000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.3000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JMC 4/2011

Form 1 Analysis Data Sheet Equivalent

031

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-020911-SW
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFV
Matrix:	WATER	**Lab Sample ID:**	G1B100573005
% Solids:	0.0	**Date/Time Collected:**	02/09/11 7:00
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	2.0000	U		P
7440-50-8	Copper	2.0000	U		P
7439-89-6	Iron	40.0000	U		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	250.0000	U ~~U~~	~~UJ CCH~~	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

no validation flag JAC 5/11

JAC 4/26/11

032

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-020911-SW
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFV
Matrix:	WATER	**Lab Sample ID:**	G1B100573005
% Solids:	0.0	**Date/Time Collected:**	02/09/11 7:00
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	2.0000	U		P
7440-50-8	Copper	2.0000	U		P
7439-89-6	Iron	40.0000	U		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	250.0000	U ~~UJ~~	~~UJ CCH~~	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.0000	U		P
7440-66-6	Zinc	10.0000	U		P

no validation flag JAC 5/4/11

U Result is less than the reporting limit. (RL)

JAC 4/20/11

033

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFW
Matrix:	WATER	**Lab Sample ID:**	G1B100573006
% Solids:	0.0	**Date/Time Collected:**	02/09/11 11:35
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2010.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.4000	J		P
7440-39-3	Barium	68.8000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	604000.00			P
7440-47-3	Chromium	4.2000	J		P
7440-48-4	Cobalt	3.0000			P
7440-50-8	Copper	12.1000			P
7439-89-6	Iron	1910.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	698000.00			P
7439-96-5	Manganese	59.0000	J		P
7440-02-0	Nickel	~~2.4000~~	~~J~~	R OT	P
7440-09-7	Potassium	186000.00			P
7782-49-2	Selenium	5.0000	U		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5740000.0		J CCH	P
7440-28-0	Thallium	0.7000	J		P
7440-62-2	Vanadium	11.3000	J		P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/2/11

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-5SW04-0211
Lot Number:	G1B100573	Lab WorkOrder:	MEAFW
Matrix:	WATER	Lab Sample ID:	G1B100573006
% Solids:	0.0	Date/Time Collected:	02/09/11 11:35
Units:	UG/L	Date/Time Received:	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.1000	J		P
7440-39-3	Barium	64.0000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	560000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	2.0000	J		P
7440-50-8	Copper	10.5000			P
7439-89-6	Iron	40.9000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	661000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	~~Nickel~~	~~5.3000~~		R OT	P
7440-09-7	Potassium	179000.00			P
7782-49-2	Selenium	19.2000	J		P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5300000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	3.4000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW05-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFX
Matrix:	WATER	**Lab Sample ID:**	G1B100573007
% Solids:	0.0	**Date/Time Collected:**	02/09/11 12:30
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2700.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.9000	J		P
7440-39-3	Barium	71.1000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	606000.00			P
7440-47-3	Chromium	6.2000			P
7440-48-4	Cobalt	2.9000	J		P
7440-50-8	Copper	11.2000			P
7439-89-6	Iron	2140.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	699000.00			P
7439-96-5	Manganese	71.2000	J		P
7440-02-0	Nickel	2.2000	J		P
7440-09-7	Potassium	189000.00			P
7782-49-2	Selenium	~~2.5000~~	~~U~~	R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5590000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.2000			P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JLC 4/26/11

036

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW05-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFX
Matrix:	WATER	**Lab Sample ID:**	G1B100573007
% Solids:	0.0	**Date/Time Collected:**	02/09/11 12:30
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	67.7000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	581000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.9000	J		P
7440-50-8	Copper	9.9000			P
7439-89-6	Iron	252.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	677000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	3.9000			P
7440-09-7	Potassium	187000.00			P
7782-49-2	Selenium	~~18.3000~~		R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5490000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.3000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

037

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-EB01-020911SD
Lot Number:	G1B100573	Lab WorkOrder:	MEA3X
Matrix:	WATER	Lab Sample ID:	G1B100573008
% Solids:	0.0	Date/Time Collected:	02/09/11 7:20
Units:	UG/L	Date/Time Received:	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	51.4000	J		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	26.7000	J		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	568.0000	~~U~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 4/26/11

038

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

General Chemistry

Lot-Sample #...: G1B100573-001 Work Order #...: MEAFP Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~B~~ U5 H	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:14 DL.....: 2.0

JC 4/26/11

039

CH2M Hill Inc

Client Sample ID: VEECA-5SW02-0211

General Chemistry

Lot-Sample #...: G1B100573-002 Work Order #...: MEAFQ Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~B~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:14 DL.....: 2.0

JC 4/26/11

040

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

General Chemistry

Lot-Sample #...: G1B100573-003 Work Order #...: MEAFR Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:15 DL.....: 2.0

JC 4/26/11

041

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

General Chemistry

Lot-Sample #...: G1B100573-004 Work Order #...: MEAFT Matrix.....: WATER
Date Sampled...: 02/09/11 10:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 J U5 HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:16 DL.....: 2.0

JAC 4/2/11

042

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911-SW

General Chemistry

Lot-Sample #...: G1B100573-005 Work Order #...: MEAFV Matrix.....: WATER
Date Sampled...: 02/09/11 07:00 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U US HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:17 DL.....: 2.0

JAC 4/26/11

043

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211

General Chemistry

Lot-Sample #...: G1B100573-006 Work Order #...: MEAFW Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 J UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:18 DL.....: 2.0

JAC 4/2011

044

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211

General Chemistry

Lot-Sample #...: G1B100573-007 **Work Order #...:** MEAFX **Matrix.....:** WATER
Date Sampled...: 02/09/11 12:30 **Date Received..:** 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~J~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:19 DL.....: 2.0

JC 4/26/11

045

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SD

General Chemistry

Lot-Sample #...: G1B100573-008 Work Order #...: MEA3X Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:20 DL.....: 2.0

JAC 4/26/11

046

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211-F

General Chemistry

Lot-Sample #...: G1B100573-009 Work Order #...: MEA87 Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~B~~ US HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:23 DL.....: 2.0

JC 4/2011

047

CH2M Hill Inc

Client Sample ID: VEECA-5SW-02-0211-F

General Chemistry

Lot-Sample #...: G1B100573-010 Work Order #...: MEA88 Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~B~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:23 DL.....: 2.0

JC 4/26/11

048

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211-F

General Chemistry

Lot-Sample #...: G1B100573-011 Work Order #...: MEA9A Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:24 DL.....: 2.0

JLC 4/26/11

1049

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211-F

General Chemistry

Lot-Sample #...: G1B100573-012 **Work Order #...:** MEA9C **Matrix.....:** WATER
Date Sampled...: 02/09/11 10:55 **Date Received..:** 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:24 DL.....: 2.0

JAC 4/26/11

050

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SW-F

General Chemistry

Lot-Sample #...: G1B100573-013 Work Order #...: MEA9E Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U WJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:25 DL.....: 2.0

JAC 4/26/11

051

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211-SD-F

General Chemistry

Lot-Sample #...: G1B100573-014 Work Order #...: MEA9H Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:25 DL.....: 2.0

JAC 4/26/11

052

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211-F

General Chemistry

Lot-Sample #...: G1B100573-015 Work Order #...: MEA9K Matrix.....: WATER
Date Sampled...: 02/09/11 12:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ WJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:26 DL.....: 2.0

JAC 42611

053

Case Narrative

TestAmerica West Sacramento Project Number G1B100573

General Comments

Please note that the temperature of the samples were recorded as 1 and 0 degrees Celsius (C) and the temperature blank was 0 degree C. Wet ice was used as the cooling agent. Also 8 poly bottles were received for sample VEECA-EB01-020911 but the chain of custody (COC) lists 6. The labels on some bottles indicated a collection time of 7:00 although the COC indicated 7:20.

A set of bottles were received with client ID VEECA-EB01-020911SD and another set with VEECA-EB01-020911SW. The client was consulted and instructed the lab to identify the sample bottles with VEECA-EB01-020911SW as the sample on the COC VEECA-EB01-020911. The bottles were consistent with the tests requested on the COC. The sample VEECA-EB01-020911SD was added to the COC for explosives via 8330B, perchlorate via 6850, metals via 6010B/6020 and hexavalent chromium via 7196.

The samples were received past the recommended holding time for hexavalent chromium. The client was notified and instructed the laboratory to proceed with the analysis.

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

WATER, 6850/DOD Handbook, Perchlorate
Samples: 1, 2, 3, 4, 5, 6, 7, 8
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

054

Case Narrative

TestAmerica West Sacramento Project Number G1B100573

WATER, 8330B, Nitroaromatics & Nitramines

Samples: 1, 3, 6

The noted samples required manual integration for several compounds. Detailed information can be found in the Manual Integration Addendum section of this report.

WATER, 6010B, Total and Dissolved Metals

Samples: 1, 2, 3, 4, 5, 6, 7, 8

The recoveries for Iron, Aluminum, Sodium and/or Vanadium are outside the established control limits for the matrix spike and/or matrix spike duplicate (MS/MSD) associated with these batches. The concentration of calcium, magnesium and sodium in the parent sample is greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

In addition, due to the complex matrix of samples -1,-2,-3,-4,-6, and -7, they were analyzed at 10x dilutions. The initial analysis at 1x was un-reportable as some elements were outside the linear range and had internal standard issues. All results for these samples were reported from the 10x analysis.

WATER, 6020, Total and Dissolved Metals

Samples: 1, 2, 3, 4, 5, 6, 7, 8

All samples required dilution for cadmium due to matrix interference. Initial analysis had results greater then the negative of the reporting limit. Reporting limits were raised accordingly.

WATER, 6020, Total Metals

Samples: 1, 2, 3, 4, 5, 6, 7, 8

The elements manganese, nickel, cadmium, barium and zinc are verified trace impurities in the ICS-A solution. As such, they may not meet the acceptance criteria, but corrective action does not apply, per DoD QSM.

WATER, 7196A, Hexavalent Chromium

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

The samples were received in the laboratory after the recommended 24 hour holding time for the test had been exceeded. The samples were analyzed after consultation with the client.

Samples: 9, 10, 11, 12, 13, 14, 15

Due to reporting limitations the samples submitted for dissolved hexavalent chromium have been reported as samples 9 through 14.

Case Narrative

TestAmerica West Sacramento Project Number G1B100573

There were no other anomalies associated with this project.

056

Sample Summary

TestAmerica West Sacramento Project Number G1B100573

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEAFP	1	VEECA-5SW01-0211	2/9/2011 09:25 AM	2/10/2011 01:15 PM
MEAFQ	2	VEECA-5SW02-0211	2/9/2011 10:10 AM	2/10/2011 01:15 PM
MEAFR	3	VEECA-5SW02P-0211	2/9/2011 10:10 AM	2/10/2011 01:15 PM
MEAFT	4	VEECA-5SW03-0211	2/9/2011 10:55 AM	2/10/2011 01:15 PM
MEAFV	5	VEECA-EB01-020911-SW	2/9/2011 07:00 AM	2/10/2011 01:15 PM
MEAFW	6	VEECA-5SW04-0211	2/9/2011 11:35 AM	2/10/2011 01:15 PM
MEAFX	7	VEECA-5SW05-0211	2/9/2011 12:30 PM	2/10/2011 01:15 PM
MEA3X	8	VEECA-EB01-020911SD	2/9/2011 07:20 AM	2/10/2011 01:15 PM
MEA87	9	VEECA-5SW01-0211	2/9/2011 09:25 AM	2/10/2011 01:15 PM
MEA88	10	VEECA-5SW-02-0211	2/9/2011 10:10 AM	2/10/2011 01:15 PM
MEA9A	11	VEECA-5SW02P-0211	2/9/2011 10:10 AM	2/10/2011 01:15 PM
MEA9C	12	VEECA-5SW03-0211	2/9/2011 10:55 AM	2/10/2011 01:15 PM
MEA9E	13	VEECA-EB01-020911SW	2/9/2011 07:20 AM	2/10/2011 01:15 PM
MEA9H	14	VEECA-5SW04-0211-SD	2/9/2011 11:35 AM	2/10/2011 01:15 PM
MEA9K	15	VEECA-5SW05-0211	2/9/2011 12:30 PM	2/10/2011 01:15 PM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

057

G1B100573

A Division of SPECTRUM ANALYTICAL, INC. Featuring HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 7

Special Handling:
TAT- Indicate Date Needed: _____
· All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
· Samples disposed of after 30 days unless otherwise instructed.

Report To: Michael Zamboni / WDC
15010 Conference Center Dr
Suite 200
Chantilly, VA 20151
703-376-5111 michael.zamboni@ch2m.com
Project Mgr.: Bill Hannah / VBO

Invoice To: _____
P.O. No.: _____ RQN: _____

Project No.: 402244.F1.SW.06 CTO 111
Site Name: ECA Lagoon
Location: Vieques State: PR
Sampler(s): D. Ballam J. Martin

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid 7=CH_3OH
8= $NaHSO_4$ 9=_____ 10=_____ 11= _____

List preservative code below:

Notes:

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State specific reporting standards: _____

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Metals	Explo	Metal (Reserved HNO3)	Metal Hex Cr	F Metal (Preserved HNO3)	F Metal Hex Cr	Exp Perch	WCHEM	PEST/PCBS	Notes
1	VEECA-SSW01-0211	2/9/11	0925				2		5		✓	✓	✓	✓	✓	✓			
2	VEECA-SSW-02-0211	2/9/11	1010				2		5		✓	✓	✓	✓	✓	✓			
3	VEECA-SSW02P-0211	2/9/11	1010				2		5		✓	✓	✓	✓	✓	✓			
4	VEECA-SSW03-0211	2/9/11	1055				2		5		✓	✓	✓	✓	✓	✓			
5	VEECA-EB01-020911	2/9/11	0920				4		6		✓	✓	✓	✓	✓	✓			per M. Zamboni - correct ID = VEECA-EB01-020911SW
	[illegible]	2/8/11	1300				1	3		✓							✓	✓	
	[illegible]		1300					3		✓								✓	
	[illegible]		1320				1	3		✓							✓	✓	
	[illegible]		1330				1	3		✓							✓	✓	
	[illegible]		1400				1	3		✓							✓	✓	

☐ E-mail to _____
EDD Format _____

Relinquished by:	Received by:	Date:	Time:
[signature]	[signature]	2-10-11	1330

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C _____

G1B100573

G1B100573 № 02394

CHAIN OF CUSTODY

CompuChem
a division of Liberty Analytical Corp.

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

Page ____ of ____

Courier
Airbill No.
Sampling Complete? Y or N

Company Name: CH2M HILL
Address: 5700 Cleveland Str Suite 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Victoria Weber
Phone #: 757-671-6208
Sampler's Name: J. Martin / D. Ballam

Project Name:
Sampling Location: ECA Lagoon
Turnaround time:
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)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Explo	Metal (Preserved HNO3)	Metal Hex Cr	Metal (Preserved HNO3)	F Metal Hex Cr	Exp Perch					
6	VEECA-SSW04-0211-SD	2/9/11	1135		21							✓	✓	✓	✓	✓	✓					
7	VEECA-SSW05-0211	2/9/11	1230		7							✓	✓	✓	✓	✓	✓					
8	VEECA-EB01-020911	SD										✓	✓	✓			✓					

Added RS 2/10/11 per discussion w/ Mike Zamboni

Sample Unpacked By:
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

Relinquished by:	Date/Time: 2/10/11 1200	Received by:	Date/Time: 2-10-11 1330
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: °C

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

White & Yellow copy to lab • Pink copy for customer

Technical Services Not Secure (919) 379-5600

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M Hill PM K.S LOG # 69316

LOT# (QUANTIMS ID) G1B100573 QUOTE# 85113 LOCATION W 5B

Checked (✓)

DATE RECEIVED 2-10-11 TIME RECEIVED 1315 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____ See temp. sheets

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials Date 2-10-11

---

pH MEASURED ☑ YES ☐ ANOMALY ~~☑ N/A~~ ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials Date 2-10-11

Notes VEECA – FB01 reid 6 8 polys, cor, nts 6

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2MHill LOT# (QUANTIMS ID): G1B100573

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) NA ☑

COC #(S) ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: NA CORRECTED ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4[ ] # 5☐ ☐ OTHER ☑

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600159 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: NA CORRECTED ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☐

COOLER ID 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: 1 CORRECTED 1 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 0 0 AVERAGE: 0 CORRECTED 0 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

CA 8-10-11

Initials Date 061

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): G1B100573

Checked (✓)

COOLER ID 4 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 0 AVERAGE: 0 CORRECTED 0 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S)

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S)

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

Initials: AK Date: 2-10-11

062

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B100573

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	2	2	2	2.	2	6	2	2												
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn	2	2	2	2	2	6	2	1												
500PJna																				
500PJzn/na																				
250PJ	2	2	2	2	2	6	2	2	1	1	1	1	1	3	1					
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 063

G1B100573

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B100573

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AGBs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X		X	X	X	X	X	X	X	X												
			X		X	X	X	X	X	X	X													
			X						X	X														
			X						X	X														
			X							X														
			X							X														
500PJna	500PJzn/na	250PJna	250PJzn/na		pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2	pH≥2

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: March 4, 2011

This memo is to document corrections made to the Chains of Custody (COC) and laboratory log-ins for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

~~IB120440~~
IC040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-5SD01-000H-0211	TOC – Lloyd Kohn	2/10/2011	09:30
VEECA-5SD02-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:00
VEECA-5SD03-000H-0211	TOC – Lloyd Kohn	2/10/2011	11:05
VEECA-5SD04-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:45
VEECA-5SD05-000H-0211	TOC – Lloyd Kohn	2/9/2011	13:20
VEECA-5SD06-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:05
VEECA-5SD07-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:25
VEECA-5SD08-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:00
VEECA-5SD09-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:20
VEECA-5SD10-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:25
VEECA-5SD11-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:55
VEECA-5SD12-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:00
VEECA-5SD13-000H-0211	TOC – Lloyd Kohn	2/10/2011	16:00
VEECA-5SD14-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:25
VEECA-5SD15-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:35

The following samples need updated sample IDs, dates, and/or times:

GIB100573-5
IB120440+C040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-EB01-020911-SW	2/9/2011	07:00	MEAFV
VEECA-5SD01-000H-0211	2/10/11	09:30	MEDMQ
VEECA-5SD02-000H-0211	2/10/11	09:00	MEDMR
VEECA-5SD02P-000H-0211	2/10/11	09:00	MEDNM

17

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

G1B120440 +
J1C040608

	VEECA-5SD03-000H-0211	2/10/11	11:05	MEDMT	
	VEECA-5SD04-000H-0211	2/10/11	10:45	MEDMV	
	VEECA-5SD05-000H-0211	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-MS	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-SD	2/10/11	13:20	MEDMW	
	VEECA-5SD06-000H-0211	2/10/11	14:05 OK	MEDMX	
	VEECA-5SD07-000H-0211	2/10/11	14:25 (10:15)	MEDM0	
	VEECA-5SD08-000H-0211	2/10/11	15:00 (10:30)	MEDM1	
	VEECA-5SD09-000H-0211	2/10/11	12:20 (12:30)	MEDM2	
	VEECA-5SD10-000H-0211	2/10/11	10:25 (11:30)	MEDM3	
	VEECA-5SD11-000H-0211	2/10/11	09:55	MEDM4	
	VEECA-5SD11P-000H-0211	2/10/11	09:55	MEDNJ	216
	VEECA-5SD12-000H-0211	2/10/11	12:00	MEDMS	
	VEECA-5SD13-000H-0211	2/10/11	16:00	MEDNF	
	VEECA-5SD14-000H-0211	2/10/11	15:25	MEDNG	
	VEECA-5SD15-000H-0211	2/10/11	15:35	MEDNH	
G1B100573 -2	VEECA 5SW02-0211	2/9/11	10:10	MEAFQ	✓
-6	VEECA 5SW04-0211	2/9/11	11:35	MEAFW	✓
	VEECA 5SW04-0211-MS	2/9/11	11:35	MEAFW	✓
-5	VEECA-EB01-020911-SW	2/9/11	07:00	MEAFV	✓
-1B190434 -4	VEECA-6SMI05-0211	2/17/11	15:00	MEMJR	✓
-1B230594-1	VEECA-4SB01-001H-0211 *	2/18/11	08:30	MEQ97	✓
-1B040475-2	VEECA-4SMI02-0211 ✓	2/2/11 ✓	11:00 ✓	MD3CL	✓

* from VEECA-4SB01-TTBB-0211

COPYRIGHT 2011 BY CH2M HILL, INC. - COMPANY CONFIDENTIAL

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B100573

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [ ] ___ [✓]

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [ ] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/9/11 Prep 2/11/11
Recd 2/10/11 Analy 2/23-24/11

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

Temp 0-3°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

070

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

Listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [ ] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

Listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [ ] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? windows not provided, just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

072

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [✓] ___ ___

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [ ] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Soil
0 out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

Soil
0 out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-020911-SW MO⊕

078

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] [✓] ___

not provided only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

W/in 1 min

086

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? see below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked Cal in sequence and compared RT to check stability -OK-

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

082

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ✓
2. Other [ ] ___ ✓

18.0 Nitroaromatics and Nitramines Identification

no ⊕

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

083

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? ✓ ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ ✓ ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. ✓ ___ ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

VEECA-5SW02-0211
VEECA-5SW02P-0211 > NO ⊕

Field Triplicate → none submitted for this pkg.

Initial Calibration Date: 1/8/2011

RRF and %RSD Calculations:

Compound Name: 4-AM-2,6-DNT, level 5
Lab Value: 79.8500

Height of Compound	7985
Conc. of Compound	100
Calculated RF	79.850

Compound Name: nitrobenzene
Lab Value: 8.6

RF of STD 1	81.40
RF of STD 2	86.30
RF of STD 3	79.30
RF of STD 4	82.02
RF of STD 5	77.79
RF of STD 6	80.00
RF of STD 7	73.33
RF of STD 8	64.21
Calculated % RSD	8.6

Continuing Calibration File ID: 2/23/11, 17:54

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	18862
Conc. of Compound	200
Calculated RF	94.310

Compound Name: tertyl
Lab Value: 5

Average RF	100.000
RF of CCV	94.310
Calculated % D	5.7

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacquelline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.48	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27	MR 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	±3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/9/11
Received Date: 2/10/11
Prep Date: 2/22/11
Analysis Dates: 2/22-23/11
Cooler Temp: 0-3°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

No contamination was noted in the method and/or grinding blanks – no qualifications required. Associated QC blanks were: VEECA-EB01-020911-SW (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for sample VEECA-5SW04-0211—all criteria were met.

Field Duplicate Sample

A field duplicate was submitted for samples VEECA-5SW02-0211—no positive results, no qualifications.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer _____ **Date:** 4/22/11

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, April 22, 2011 4:04 PM
To: DataQual Environmental Services, LLC
Subject: RE: Perchlorate SDG#G1B100573
Attachments: Pages from G1B100573.pdf

Please accept my apology for this issue. I'm still working on getting you the answers to you initial question.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, April 22, 2011 12:35 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Perchlorate SDG#G1B100573

Hi Karen,

The submitted perchlorate data package for SDG# G1B100573 is missing pages 140-147. Please supply these missing pages.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

	YES	NO	N/A
A.I.I **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]		
Legible?	[✓]		
Signature of sample custodian present?	[✓]		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]	✓	

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]	_	_
Are percent solids calculations present for soils/sediments?	[_]	_	✓
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]	_	_

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

ICP-AES?	[_]	_	_
ICP-MS?	[_]	_	_
Mercury?	[_]	_	_
Cyanide?	[_]	_	_

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

Legible?	[_]	_	_
Properly labeled?	[_]	_	_

Are all field samples, QC samples and field QC samples present on:

Digestion/Distillation log?	[_]	_	_
Instrument Printouts?	[_]	_	_

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.9 **Technical Holding Times**: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)			
A.1.9.1 Cyanide distillation(14 days)exceeded?	_	[ ]	✓
Mercury analysis(28 days) exceeded?	_	[ ]	✓
Other Metals analysis(180 days)exceeded?	___	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

	YES	NO	N/A
A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]	___	___
Cyanide Analysis ≥ 12?	[ ]	_	✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[ ]	_	✓

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

CH2M HILL VIEQUES CTO-111 METALS CALCULATIONS

SDG G1B100573

2/16, 1638

ICP - AES	
SAMPLE ID	VEECA-5SW01-0211 T
ANALYTE	magnesium
Lab Value CONCENTRATION (ug/L)	708000
AMOUNT FROM RAW DATA (mg/L)	70.752
SAMPLE SIZE (ml)	50
FINAL VOLUME (L)	50
DILUTION FACTOR	10
CONVERSION FACTOR	1000
CALCULATED CONCENTRATION (ug/L)	707520

2/24, 2132

ICP-MS	
SAMPLE ID	VEECA-5SW03-0211 D
ANALYTE	selenium
Lab Value CONCENTRATION (ug/L)	12.8
AMOUNT FROM RAW DATA (ug/L)	12.765013
SAMPLE SIZE (ml)	50
FINAL VOLUME (ml)	50
DILUTION FACTOR	1
DRYNESS FACTOR	1
CONVERSION FACTOR	1
CALCULATED CONCENTRATION (ug/L)	12.8

		YES	NO	N/A
	present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[___]	___	✓
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were required but this is not noted on the Form Is

A.1.11 **Initial Calibration**

A.1.11.1	Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
	Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
	Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
	Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2	Is the curve correlation coefficient ≥ 0.995 for:			

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

see following pages for any necessary qualifications

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B100573 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 13:01 CCV 1 Found %REC		02/25/11 13:12 CCV 2 Found %REC		02/25/11 13:59 CCV 3 Found %REC	
Arsenic	100	101.85	101.8	98.74	98.7	97.46	97.5
Chromium	100	101.86	101.9	99.06	99.1	88.66	88.7
Copper	100	101.42	101.4	98.09	98.1	103.61	103.6
Iron	5100	5131.6	100.6	5100.0	100.0	4838.7	94.9
Lead	100	98.47	98.5	100.34	100.3	104.30	104.3
Nickel	100	100.39	100.4	98.11	98.1	98.72	98.7
Selenium	100	99.85	99.8	99.60	99.6	103.09	103.1

no samples assoc.

Lot Number: G1B100573 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 14:07 CCV 4 Found %REC		02/25/11 14:55 CCV 5 Found %REC		02/25/11 15:12 CCV 6 Found %REC	
Arsenic	100	98.87	98.9	99.15	99.1	99.35	99.3
Chromium	100	99.89	99.9	95.58	95.6	97.88	97.9
Lead	100	99.17	99.2	101.82	101.8	98.70	98.7
Selenium	100	96.70	96.7	97.65	97.6	100.35	100.4

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B100573 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 15:49 CCV 7 Found %REC		02/25/11 16:00 CCV 8 Found %REC		02/25/11 16:06 CCV 9 Found %REC	
Arsenic	100	99.60	99.6	113.50	113.5	99.28	99.3
Chromium	100	96.61	96.6				
Lead	100	100.50	100.5	97.82	97.8	100.54	100.5
Selenium	100	99.00	99.0	125.83	125.8	98.62	98.6

NQ

no samples asoo C

Lot Number: G1B100573 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110225B1

Analyte	True Conc.	02/25/11 16:38 CCV 10 Found %REC		02/25/11 16:44 CCV 11 Found %REC		02/25/11 17:25 CCV 12 Found %REC	
Arsenic	100	96.93	96.9	100.14	100.1	99.41	99.4
Lead	100	101.38	101.4	98.22	98.2	98.09	98.1
Selenium	100	97.51	97.5	99.70	99.7	99.69	99.7

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B100573 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228B1

Analyte	True Conc.	02/28/11 16:17 ICV Found	%REC	02/28/11 16:27 ICV REPOUR Found	%REC
Arsenic	80	78.41	98.0	77.30	96.6
Cadmium	80	82.25	102.8	80.90	101.1
Chromium	80	84.38	105.5	82.75	103.4
Selenium	80	81.70	102.1	77.79	97.2
Thallium	40	44.54	111.3	43.84	109.6

↳ no quals - ICV rerun with acceptable results

CH2M Hill Inc

Initial and Continuing Calibration Verification

		02/16/11 14:25 ICV4 Found %REC	02/16/11 14:28 ICV2A Found %REC
Manganese	1000	1030.1 103.0	
Nickel	0		
	1000	1019.3 101.9	
Potassium	0		82.37 0.0
	10000	9881.9 98.8	
Silver	0		
	250	244.65 97.9	
Sodium	10000	11505 115.1	
	25000		25187 100.7
Vanadium	0		
	1000	978.62 97.9	
Zinc	0		1.77 0.0
	1000	997.90 99.8	

J + Na all samples assoc.

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note: CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab method/SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

112

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:23 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B100574_LLQS.pdf; G1B050467_LLQS.pdf; G1B090534_LLQS.pdf; G1B230488_LLQS.pdf; G1B100573_LLQS.pdf

Jackie,
And here are the last 5 files of supplemental raw data for this issue.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? unassoc. std	[✓]	___	___
Mercury- 70 - 130%? RCd 5/6/11	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[ ]		✓

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

no ICB/CCB contamination was noted

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

	YES	NO	N/A
A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?		[✓]	

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

	YES	NO	N/A
A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?		[✓]	

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

	YES	NO	N/A
A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?		[✓]	

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

	YES	NO	N/A
A.1.15.1 Was one Preparation Blank prepared with and analyzed for:			
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

	YES	NO	N/A
A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL?	___	[✓]	✓

ACTION:
If yes, change sample result ≥ MDL

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples? @ beginning only	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each concentration range (i.e., low, med., high)?	[___]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[___]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

See Forms for any necessary qualifications

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	* ✓	[✓]	___
	(b) between 30-74%?	___	[✓]	___
	(c) between 126-150%?	✓	[___]	___
	(d) greater than 150%?	* ✓	[___]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

* out due to abundance
see next pages for flags

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MS
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006S
% Solids	0.0	**QC Batch ID:**	1045234
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Aluminum	80 - 120	4680.0000	N	2010.0000		2000.0000	133.0	N	P
Barium	80 - 120	2110.0000		68.8000	J	2000.0000	102.0		P
Beryllium	80 - 120	49.7000		10.0000		50.0000	99.0		P
Calcium	80 - 120	661000.0000		604000.0000		50000.0000	114.0		P
Magnesium	80 - 120	754000.0000		698000.0000		50000.0000	112.0		P
Manganese	80 - 120	580.0000		59.0000	J	500.0000	104.0		P
Potassium	80 - 120	241000.0000		186000.0000		50000.0000	110.0		P
Sodium	80 - 120	5790000.0000		###########		50000.0000	108.0		P
Zinc	80 - 120	506.0000		100.0000		500.0000	100.0		P

J+

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MSD
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006D
% Solids	0.0	**QC Batch ID:**	1045234
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	4650.0000	N	2010.0000		2000.0000	132.0	N	P	J+
Barium	80 - 120	2090.0000		68.8000	J	2000.0000	101.0		P	
Beryllium	80 - 120	49.5000		10.0000		50.0000	99.0		P	
Calcium	80 - 120	652000.0000		604000.0000		50000.0000	97.0		P	
Magnesium	80 - 120	750000.0000		698000.0000		50000.0000	103.0		P	
Manganese	80 - 120	580.0000		59.0000	J	500.0000	104.0		P	
Potassium	80 - 120	238000.0000		186000.0000		50000.0000	104.0		P	
Sodium	80 - 120	###########	N	###########		50000.0000	0.0	N	P	* NQ
Zinc	80 - 120	507.0000		100.0000		500.0000	100.0		P	

N Spike sample recovery is outside control limits.

* Na ont due to abundance

CH2M Hill Inc

Dissolved Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MS
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006S
% Solids	0.0	**QC Batch ID:**	1045189
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Aluminum	80 - 120	2070.0000		1000.0000		2000.0000	91.0		P
Barium	80 - 120	2050.0000		64.0000	J	2000.0000	99.0		P
Beryllium	80 - 120	48.3000		10.0000		50.0000	97.0		P
Calcium	80 - 120	617000.0000		560000.0000		50000.0000	115.0		P
Magnesium	80 - 120	712000.0000		661000.0000		50000.0000	103.0		P
Manganese	80 - 120	512.0000		50.0000		500.0000	100.0		P
Potassium	80 - 120	232000.0000		179000.0000		50000.0000	105.0		P
Sodium	80 - 120	5410000.0000	N	###########		50000.0000	228.0	N	P
Zinc	80 - 120	485.0000		100.0000		500.0000	97.0		P

NQ

N Spike sample recovery is outside control limits.

out due to abundance

CH2M Hill Inc

Dissolved Metals Duplicate Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MSD
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006D
% Solids	0.0	**QC Batch ID:**	1045189
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Aluminum	80 - 120	2180.0000		1000.0000		2000.0000	96.0		P
Barium	80 - 120	2030.0000		64.0000	J	2000.0000	98.0		P
Beryllium	80 - 120	47.5000		10.0000		50.0000	95.0		P
Calcium	80 - 120	606000.0000		560000.0000		50000.0000	93.0		P
Magnesium	80 - 120	711000.0000		661000.0000		50000.0000	101.0		P
Manganese	80 - 120	509.0000		50.0000		500.0000	100.0		P
Potassium	80 - 120	229000.0000		179000.0000		50000.0000	99.0		P
Sodium	80 - 120	###########	N	###########		50000.0000	181.0	N	P
Zinc	80 - 120	479.0000		100.0000		500.0000	96.0		P

NQ

N Spike sample recovery is outside control limits.

125

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MS
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006S
% Solids	0.0	**QC Batch ID:**	1042156
Units:	UG/L	**Instrument ID:**	M01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Antimony	80 - 120	182.0000		4.0000		200.0000	91.0		P
Arsenic	80 - 120	200.0000		1.4000	J	200.0000	99.0		P
Cadmium	80 - 120	191.0000		0.5000		200.0000	96.0		P
Chromium	80 - 120	220.0000		4.2000	J	200.0000	108.0		P
Cobalt	80 - 120	202.0000		3.0000		200.0000	100.0		P
Copper	80 - 120	199.0000		12.1000		200.0000	94.0		P
Iron	80 - 120	3170.0000	N	1910.0000		1000.0000	125.0	N	P
Lead	80 - 120	187.0000		1.0000		200.0000	94.0		P
Nickel	80 - 120	191.0000		2.4000	J	200.0000	95.0		P
Selenium	80 - 120	225.0000		5.0000		200.0000	112.0		P
Silver	80 - 120	41.5000		0.5000		50.0000	83.0		P
Thallium	80 - 120	49.8000		0.7000	J	50.0000	98.0		P
Vanadium	80 - 120	235.0000		11.3000	J	200.0000	112.0		P

N Spike sample recovery is outside control limits.

* No Quals MSD is OK

126

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MSD
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006D
% Solids	0.0	**QC Batch ID:**	1042156
Units:	UG/L	**Instrument ID:**	M01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Antimony	80 - 120	182.0000		4.0000		200.0000	91.0		P
Arsenic	80 - 120	201.0000		1.4000	J	200.0000	100.0		P
Cadmium	80 - 120	202.0000		0.5000		200.0000	101.0		P
Chromium	80 - 120	234.0000		4.2000	J	200.0000	115.0		P
Cobalt	80 - 120	214.0000		3.0000		200.0000	106.0		P
Copper	80 - 120	205.0000		12.1000		200.0000	96.0		P
Iron	80 - 120	3050.0000		1910.0000		1000.0000	114.0		P
Lead	80 - 120	188.0000		1.0000		200.0000	94.0		P
Nickel	80 - 120	198.0000		2.4000	J	200.0000	98.0		P
Selenium	80 - 120	241.0000		5.0000		200.0000	120.0		P
Silver	80 - 120	41.5000		0.5000		50.0000	83.0		P
Thallium	80 - 120	50.6000		0.7000	J	50.0000	100.0		P
Vanadium	80 - 120	250.0000		11.3000	J	200.0000	119.0		P

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Dissolved Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MS
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006S
% Solids	0.0	**QC Batch ID:**	1042166
Units:	UG/L	**Instrument ID:**	M01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Antimony	80 - 120	180.0000		4.0000		200.0000	89.0		P
Arsenic	80 - 120	200.0000		1.1000	J	200.0000	100.0		P
Cadmium	80 - 120	200.0000		10.0000		200.0000	100.0		P
Chromium	80 - 120	234.0000		4.0000		200.0000	116.0		P
Cobalt	80 - 120	205.0000		2.0000	J	200.0000	102.0		P
Copper	80 - 120	190.0000		10.5000		200.0000	90.0		P
Iron	80 - 120	1100.0000		40.9000	J	1000.0000	106.0		P
Lead	80 - 120	188.0000		1.0000		200.0000	94.0		P
Nickel	80 - 120	190.0000		5.3000		200.0000	92.0		P
Selenium	80 - 120	224.0000		19.2000	J	200.0000	103.0		P
Silver	80 - 120	41.1000		0.5000		50.0000	82.0		P
Thallium	80 - 120	49.8000		1.0000		50.0000	100.0		P
Vanadium	80 - 120	251.0000	N	3.4000	J	200.0000	124.0	N	P

N Spike sample recovery is outside control limits.

128

CH2M Hill Inc

Dissolved Metals Duplicate Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SW04-0211
Lot Number:	G1B100573	**MS Lab Workorder:**	MEAFW - MSD
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006D
% Solids	0.0	**QC Batch ID:**	1042166
Units:	UG/L	**Instrument ID:**	M01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Antimony	80 - 120	180.0000		4.0000		200.0000	90.0		P
Arsenic	80 - 120	199.0000		1.1000	J	200.0000	99.0		P
Cadmium	80 - 120	189.0000		10.0000		200.0000	94.0		P
Chromium	80 - 120	238.0000		4.0000		200.0000	119.0		P
Cobalt	80 - 120	205.0000		2.0000	J	200.0000	101.0		P
Copper	80 - 120	189.0000		10.5000		200.0000	89.0		P
Iron	80 - 120	1110.0000		40.9000	J	1000.0000	107.0		P
Lead	80 - 120	187.0000		1.0000		200.0000	94.0		P
Nickel	80 - 120	187.0000		5.3000		200.0000	91.0		P
Selenium	80 - 120	223.0000		19.2000	J	200.0000	102.0		P
Silver	80 - 120	41.3000		0.5000		50.0000	83.0		P
Thallium	80 - 120	49.9000		1.0000		50.0000	100.0		P
Vanadium	80 - 120	255.0000	N	3.4000	J	200.0000	126.0	N	P

N Spike sample recovery is outside control limits.

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

A.1.17.5 **Soil/Sediment**

Are any spike recoveries:

(a) less than 10%?	___	[___]	___
(b) between 10-74%?	___	[___]	___
(c) between 126-200%?	___	[___]	___
(d) greater than 200%?	___	[___]	___

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

RPDs between MS/MSD pairs

For each SDG?	[___]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[___]	___	___

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[✓]	___
is any RPD ≥ 100%?	___	[✓]	___

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**: Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[✓]	___
> ± 2xCRQL?	___	[___]	___

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	✓

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[✓]	___	___

VEECA-SSW02-0211

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[✓]	___
is any RPD ≥ 100%?	___	[✓]	___

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[✓]	___
> ± 2 x CRQL?	___	[✓]	___

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-5SW02-0211 Total
Duplicate Sample ID: VEECA-5SW02P-0211 Total

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	1960	2040	4
arsenic	1.5	1.5	0
barium	67.6	67.4	0
cadmium			0
calcium	591000	597000	1
chromium	4.2	5.3	-1.1
cobalt	2.8	2.7	4
copper	11.8	10.7	1.1
iron	1700	1950	14
magnesium	686000	683000	0
manganese	56.5	57.1	1
nickel	2	3.6	-1.6
potassium	184000	186000	1
selenium	2.2	2.9	-0.7
sodium	5570000	5570000	0
vanadium	13.1	11.7	1.4
zinc			#DIV/0!

COMMENTS: No qualifications were required.
Region II QC limits for flagging were used.

Sample ID: VEECA-5SW02-0211 Dissolved
Duplicate Sample ID: VEECA-5SW02P-0211 Dissolved

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum			#DIV/0!
barium	64.7	61.8	2.9
cadmium			0
calcium	576000	555000	4
chromium			#DIV/0!
cobalt	1.8	1.8	0
copper	10.3	10.3	0
iron	62.7	72.3	-9.6
magnesium	686000	656000	4
manganese			#DIV/0!
nickel	1.2	2	-0.8
potassium	184000	178000	3
selenium	7.2	26.2	-19
sodium	5620000	5440000	3
vanadium	4.4	5.5	-1.1
zinc			#DIV/0!

COMMENTS: No qualifications were required.
Region II QC limits for flagging were used

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓
	ACTION: If yes, for each soil Field Duplicate pair proceed as follows:			
	Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.			
	NOTE: 1. Do not transfer "*" from Form I's to Appendix A.4. 2. Do not calculate RPD when both values are non-detects. 3.Substitute MDL for CRQL when MDL > CRQL. 4.If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.			
A.1.19.5	Circle on each Appendix A.4 all values that have:			
	RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓
	ACTION: If the RPD is ≥ 35% but < 120%,			

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS)- Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[___]	___	___
	Each batch samples digested/distilled?	[___]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[___]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[___]	✓

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[___]	✓ ___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[___]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

TAL West Sac

SERIAL DILUTION

Method: 6020 (SOP: SAC-MT-001) M01 Reported: 03/08/11 15:10:54

Department: 120 (Metals) Source: MetEdit

Sample: **MEAFWP5** Serial Dilution: **5.00** Sample Dilution: **1.00**

Instrument: **ICPMS M01** Channel 261
File: 110224A1 # 26 Method 6020_
Acquired: 02/24/2011 19:36:18 M01 Matrix: AQUEOUS
Calibrated: 02/24/2011 19:02:03 Units: ug/L

CASN	Analyte Name	M/S	Area	Dilution	Sample	%Diff.	MDL	Flag	Q
7440-41-7	Beryllium	9	4	0.15296	0.09759	56.6		*	
7429-90-5	Aluminum	27	1026129	1713.9	2545.7	32.7		*	
7440-09-7	Potassium	39	06358774	174153	265716	34.5		*	
7440-62-2	Vanadium	51	-50787	10.362	11.275	8.10	3.0	NC	☑
7440-47-3	Chromium	52	27008	-3.1114	5.4008	158	1.5	NC	☑
7439-89-6	Iron	54	282637	1656.5	1700.8	2.61	25.0	NC	☑
7439-89-6	Iron	57	191116	2950.7	1911.9	54.3	25.0	E	☐ NQ *
7439-96-5	Manganese	55	170529	57.348	62.310	7.96		*	
7440-48-4	Cobalt	59	6431	2.8397	2.9545	3.88	1.0	NC	☑
7440-02-0	Nickel	60	7603	14.062	2.4113	483	1.0	NC	☑
7440-50-8	Copper	65	7676	15.911	12.098	31.5	1.0	NC	☑
7440-66-6	Zinc	68	4056	0.52158	1.3401	61.1		*	
7440-38-2	Arsenic	75	14340	3.9305	1.3596	189	1.0	NC	☑
7782-49-2	Selenium	78	16240	32.258	13.827	133	1.0	NC	☑
7782-49-2	Selenium	82	1576	7.5240	-9.1440		1.0	NC	☑
7439-98-7	Molybdenum	97	1254	2.1584	3.1488	31.5		*	
7440-22-4	Silver	107	127	-0.10932	0.01074	1120	0.30	NC	☑
7440-43-9	Cadmium	111	-4837	-13.699	-24.015		0.50	NC	☑
7440-43-9	Cadmium	114	98	0.02488	0.03924	36.6	0.50	NC	☑
7440-36-0	Antimony	121	1583	-0.52912	0.35862	248	2.0	NC	☑
7440-39-3	Barium	135	21022	73.238	74.521	1.72		*	
7440-28-0	Thallium	205	6146	0.16829	0.70271	76.1	0.50	NC	☑
7439-92-1	Lead	208	1769	0.20341	0.23584	13.8	0.60	NC	☑
7440-61-1	Uranium	238	10145	2.6723	3.0565	12.6		*	

CASN	ISTD Name	M/S	Area	Amount	Q
LITHIUM6	Lithium-6	6	144016		☑
7440-56-4	Germanium	72	1596848		☐
7440-74-6	Indium	115	1261911		☐
7440-30-4	Thulium	169	786449		☐

* Analyte not requested for this batch, no MDL
NC : Serial dilution concentration < 100 X MDL
E : Difference greater than Limit (10%)

* Results are less than 50X LOQ (Criteria per DOD QSM 4.1) so re quals were required.

Reviewed by Date

IDB Reports TestAmerica, Inc. Version: 6.02.066

View Page 1 of 1

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	✓	[___]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	✓	[___]	___
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[✓]	___
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[✓]	___

CH2M HILL VIEQUES ECA CTO-37

SDG G1B100573

Total & Dissolved Analyte Concentrations

Note: Comparison between total and dissolved results is made only when both of the following conditions is met: 1. the dissolved concentration is greater than the total concentration, AND 2. the dissolved concentration is greater than or equal to 5X the MDL. If %Difference is greater than 20% but less than 50% results are J, if >50% results are R.

Sample ID: VEECA-5SW02-0211 T **Duplicate Sample ID:** VEECA-5SW02-0211 T

Analyte	Sample Conc.	Duplicate Conc.	% Difference
Sodium	5570000	5620000	1%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: No action required.

Sample ID: VEECA-5SW04-0211 T **Duplicate Sample ID:** VEECA-5SW04-0211 T

Analyte	Sample Conc.	Duplicate Conc.	% Difference
Nickel	2.4	5.3	121%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: Reject nickel in both samples.

Sample ID: VEECA-5SW05-0211 T **Duplicate Sample ID:** VEECA-5SW05-0211 T

Analyte	Sample Conc.	Duplicate Conc.	% Difference
selenium	2.5	18.3	632%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: Reject ~~nickel~~ selenium in both samples.

gpc 42611

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	✓	[___]	___
	ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.	See previous page for quals. JC 4/26/11		
A.1.23	**Field Blank - Form I** **NOTE**: Designate "Field Blank" as such on Form I			
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L, flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	✓
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

Dilutions were required & were performed as needed

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]		
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]		

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]		
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]		

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[ ]	✓	
If no, was the original sample diluted ~~two-fold~~ 5-fold or 10-fold, Internal Standard added and the sample re-analyzed?	[✓]		
Was the %RI for the ~~two-fold~~ 5-fold or 10-fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[✓]		

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags:**
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/9
Received Date: 2/10 Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: no prep – total & filtered water samples
Analysis Dates: 2//11 waters

All samples exceeded the 24 hour holding time requirement by approximately 30 hours. All reported results were qualified as estimated J/UJ.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair submitted in this SDG exhibited acceptable recoveries and RPD for both the total & dissoolved analyses. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: VEECA-5SW02-0211 Duplicate Sample ID: VEECA-5SW02P-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No positive results were reported.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.

Sample ID: VEECA-5SW02-0211 F Duplicate Sample ID: VEECA-5SW02P-0211 F

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No positive results were reported.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the samples in this SDG. Clarification of the calculations was requested from the laboratory. No additional qualifications to the data were required.

Received 5/3/11

Reviewer J Cleveland **Date:** 4/27/11

Hexavalent Chromium Calcs - ICAL soils - 2/11/11

X - Response	Y - Concentration (mg/L)
0.001	0
0.005	0.005
0.009	0.01
0.021	0.025
0.04	0.05
0.08	0.1

slope, m (A1) =	1.268922529
y-int, (A0) =	-0.001325319
r =	0.999967171
Rr2=	0.999934343

VEECA-5SW04-0211MS Lab Value - 53.28 ug/L

Response = 0.043

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.05323835 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial Volume (L)) * 1000 ug/mg * DF = ug/L

Sample Mass (g)		10
Sample FV (L)		10
Conversion Factor		1000
Dilution Factor		1
% Solids Factor	NA	
Concentration =		53.23835 mg/Kg

CH2M Hill Inc

Client Sample ID: VERCA-5SW01-0211

TOTAL Metals

Lot-Sample #...: G1B100573-001 Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AE
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 0.30	
Arsenic	2.0 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AF
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFP1AG
		Dilution Factor: 20		Analysis Time..: 18:42	DL.....: 10.0	
Cobalt	3.1	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AH
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 1.0	
Chromium	4.8 B	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AJ
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 1.5	
Copper	12.0	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AK
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 1.0	
Iron	2060	100	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AL
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 25.0	
Nickel	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AM
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AN
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AP
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 2.0	
Selenium	17.0	6.0	ug/L	SW846 6020	02/11-02/25/11	MEAFP1AQ
		Dilution Factor: 2		Analysis Time..: 19:03	DL.....: 2.0	
Thallium	0.54 B	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AR
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 0.50	
Vanadium	14.0	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AT
		Dilution Factor: 1		Analysis Time..: 19:44	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

TOTAL Metals

Lot-Sample #...: G1B100573-001 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	2740	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1A9
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 480	
Barium	72.4 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CA
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CC
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 3.0	
Calcium	622000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CD
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 500	
Potassium	193000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CE
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 930	
Magnesium	708000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CF
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 400	
Manganese	73.0 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CG
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 25.0	
Sodium	5710000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CH
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CJ
		Dilution Factor: 10		Analysis Time..: 16:38	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

152

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-001 Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A0
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AV
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFP1AW
		Dilution Factor: 20		Analysis Time..: 19:51	DL.....: 10.0	
Cobalt	1.9 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1AX
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A0
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 1.5	
Copper	10.0	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A1
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 1.0	
Iron	85.9 B	100	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A2
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 25.0	
Nickel	2.3 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A3
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A4
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A5
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 2.0	
Selenium	27.0 B	30.0	ug/L	SW846 6020	02/11-03/03/11	MEAFP1A6
		Dilution Factor: 10		Analysis Time..: 13:13	DL.....: 10.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A7
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 0.50	
Vanadium	4.1 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFP1A8
		Dilution Factor: 1		Analysis Time..: 21:19	DL.....: 3.0	

(Continued on next page)

153

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-001 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CK
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 480	
Barium	63.9 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CL
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CM
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 3.0	
Calcium	560000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CN
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 500	
Potassium	180000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CP
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 930	
Magnesium	661000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CQ
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CR
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 25.0	
Sodium	5270000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CT
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFP1CU
		Dilution Factor: 10		Analysis Time..: 17:08	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

154

CH2M Hill Inc

Client Sample ID: VRSCA-5SW-02-0211

TOTAL Metals

Lot-Sample #...: G1B100573-002 Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AP
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 0.30	
Arsenic	1.5 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AQ
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFQ1AR
		Dilution Factor: 20		Analysis Time..: 18:45	DL.....: 10.0	
Cobalt	2.8 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AT
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 1.0	
Chromium	4.2 B	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AU
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 1.5	
Copper	11.8	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AV
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 1.0	
Iron	1700	100	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AW
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 25.0	
Nickel	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AX
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A0
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A1
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 2.0	
Selenium	2.2 B	6.0	ug/L	SW846 6020	02/11-02/25/11	MEAFQ1A2
		Dilution Factor: 2		Analysis Time..: 19:06	DL.....: 2.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A3
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 0.50	
Vanadium	13.1	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A4
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VERCA-5SW-02-0211

TOTAL Metals

Lot-Sample #...: G1B100573-002 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	1960 J	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1A9
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 480	
Barium	67.6 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CA
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CC
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 3.0	
Calcium	591000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CD
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 500	
Potassium	184000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CE
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 930	
Magnesium	686000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CF
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 400	
Manganese	56.5 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CG
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 25.0	
Sodium	5570000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CH
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CJ
		Dilution Factor: 10		Analysis Time..: 16:46	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

156

CH2M Hill Inc

Client Sample ID: VERCA-5SW-02-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-002 Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A5
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A6
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFQ1A7
		Dilution Factor: 20		Analysis Time..: 19:54	DL.....: 10.0	
Cobalt	1.8 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1A8
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AA
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.5	
Copper	10.3	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AC
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.0	
Iron	62.7 B	100	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AD
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 25.0	
Nickel	1.2 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AE
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AF
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AG
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 2.0	
Selenium	7.2	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AH
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AJ
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 0.50	
Vanadium	4.4 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFQ1AK
		Dilution Factor: 1		Analysis Time..: 21:23	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-5SW-02-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-002 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CK
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 480	
Barium	64.7 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CL
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CM
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 3.0	
Calcium	576000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CN
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 500	
Potassium	184000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CP
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 930	
Magnesium	686000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CQ
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CR
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 25.0	
Sodium	5620000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CT
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFQ1CU
		Dilution Factor: 10		Analysis Time..: 17:16	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

158

CH2M Hill Inc

Client Sample ID: VEECA-SSW02P-0211

TOTAL Metals

Lot-Sample #...: G1B100573-003 Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AP
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 0.30	
Arsenic	1.5 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AQ
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFR1AR
		Dilution Factor: 20		Analysis Time..: 18:48	DL.....: 10.0	
Cobalt	2.7 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AT
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.0	
Chromium	5.3	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AU
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.5	
Copper	10.7	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AV
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.0	
Iron	1950	100	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AW
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 25.0	
Nickel	3.6	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AX
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A0
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A1
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 2.0	
Selenium	2.9 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A2
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A3
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 0.50	
Vanadium	11.7 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A4
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 3.0	

(Continued on next page)

159

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

TOTAL Metals

Lot-Sample #...: G1B100573-003 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	2040	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1A9
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 480	
Barium	67.4 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CA
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CC
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 3.0	
Calcium	597000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CD
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 500	
Potassium	186000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CE
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 930	
Magnesium	683000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CF
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 400	
Manganese	57.1 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CG
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 25.0	
Sodium	5570000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CH
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CJ
		Dilution Factor: 10		Analysis Time..: 16:48	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

160

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-003 Matrix.....: WATER
Date Sampled...: 02/09/11 10:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A5
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A6
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFR1A7
		Dilution Factor: 20		Analysis Time..: 19:57	DL.....: 10.0	
Cobalt	1.8 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1A8
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AA
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 1.5	
Copper	10.2	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AC
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 1.0	
Iron	72.3 B	100	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AD
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 25.0	
Nickel	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AE
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AF
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AG
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 2.0	
Selenium	26.2 B	30.0	ug/L	SW846 6020	02/11-03/03/11	MEAFR1AH
		Dilution Factor: 10		Analysis Time..: 13:17	DL.....: 10.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AJ
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 0.50	
Vanadium	5.5 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFR1AK
		Dilution Factor: 1		Analysis Time..: 21:27	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-5SW02P-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-003 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CK
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 480	
Barium	61.8 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CL
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CM
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 3.0	
Calcium	555000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CN
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 500	
Potassium	178000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CP
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 930	
Magnesium	656000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CQ
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CR
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 25.0	
Sodium	5440000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CT
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFR1CU
		Dilution Factor: 10		Analysis Time..: 17:18	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

162

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

TOTAL Metals

Lot-Sample #...: G1B100573-004 Matrix.....: WATER
Date Sampled...: 02/09/11 10:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AP
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 0.30	
Arsenic	1.7 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AQ
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFT1AR
		Dilution Factor: 20		Analysis Time..: 19:04	DL.....: 10.0	
Cobalt	3.0	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AT
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.0	
Chromium	7.5	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AU
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.5	
Copper	11.9	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AV
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.0	
Iron	2530	100	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AW
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 25.0	
Nickel	1.5 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AX
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A0
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A1
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 2.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A2
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A3
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 0.50	
Vanadium	13.9	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A4
		Dilution Factor: 1		Analysis Time..: 20:14	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

TOTAL Metals

Lot-Sample #...: G1B100573-004 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	2990	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1A9
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 480	
Barium	72.4 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CA
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CC
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 3.0	
Calcium	612000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CD
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 500	
Potassium	190000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CE
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 930	
Magnesium	699000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CF
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 400	
Manganese	77.5 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CG
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 25.0	
Sodium	5650000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CH
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CJ
		Dilution Factor: 10		Analysis Time..: 16:51	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

164

CH2M Hill Inc

Client Sample ID: VEECA-5SW03-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-004 Matrix.....: WATER
Date Sampled...: 02/09/11 10:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A5
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A6
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFT1A7
		Dilution Factor: 20		Analysis Time..: 19:13	DL.....: 10.0	
Cobalt	1.8 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1A8
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AA
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.5	
Copper	10.2	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AC
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.0	
Iron	49.7 B	100	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AD
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 25.0	
Nickel	1.5 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AE
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AF
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AG
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 2.0	
Selenium	12.8	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AH
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AJ
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 0.50	
Vanadium	4.3 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFT1AK
		Dilution Factor: 1		Analysis Time..: 21:32	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VREGA-5SW03-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-004 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CK
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 480	
Barium	62.4 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CL
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CM
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 3.0	
Calcium	551000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CN
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 500	
Potassium	177000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CP
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 930	
Magnesium	652000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CQ
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CR
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 25.0	
Sodium	5230000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CT
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFT1CU
		Dilution Factor: 10		Analysis Time..: 17:21	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

166

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SW

TOTAL Metals

Lot-Sample #...: G1B100573-005 Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AP
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AQ
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFV1AR
		Dilution Factor: 20		Analysis Time..: 19:07	DL.....: 10.0	
Cobalt	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AT
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AU
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.5	
Copper	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AV
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.0	
Iron	40.0 U	100	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AW
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 25.0	
Nickel	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AX
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A0
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A1
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 2.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A2
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A3
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 0.50	
Vanadium	4.0 U	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A4
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SW

TOTAL Metals

Lot-Sample #...: G1B100573-005 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1A9
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 48.0	
Barium	5.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CA
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 2.5	
Beryllium	1.0 U	3.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CC
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 0.30	
Calcium	250 U	500	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CD
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 50.0	
Potassium	250 U	1000	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CE
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 93.0	
Magnesium	100 U	500	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CF
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 40.0	
Manganese	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CG
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 2.5	
Sodium	250 U	1000	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CH
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 250	
Zinc	10.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CJ
		Dilution Factor: 1		Analysis Time..: 16:00	DL.....: 3.0	

168

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SW

DISSOLVED Metals

Lot-Sample #...: G1B100573-005 Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A5
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A6
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFV1A7
		Dilution Factor: 20		Analysis Time..: 19:16	DL.....: 10.0	
Cobalt	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1A8
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AA
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.5	
Copper	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AC
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.0	
Iron	40.0 U	100	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AD
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 25.0	
Nickel	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AE
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AF
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AG
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 2.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AH
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AJ
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 0.50	
Vanadium	4.0 U	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFV1AK
		Dilution Factor: 1		Analysis Time..: 21:36	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SW

DISSOLVED Metals

Lot-Sample #...: G1B100573-005 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CK
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 48.0	
Barium	5.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CL
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 2.5	
Beryllium	1.0 U	3.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CM
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 0.30	
Calcium	250 U	500	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CN
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 50.0	
Potassium	250 U	1000	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CP
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 93.0	
Magnesium	100 U	500	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CQ
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 40.0	
Manganese	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CR
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 2.5	
Sodium	250 U	1000	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CT
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 250	
Zinc	10.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFV1CU
		Dilution Factor: 1		Analysis Time..: 16:10	DL.....: 3.0	

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211-SD

TOTAL Metals

Lot-Sample #...: G1B100573-006 Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AP
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 0.30	
Arsenic	1.4 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AQ
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 1.0	
Cadmium	0.50 U	1.5	ug/L	SW846 6020	02/11-02/28/11	MEAFW1AR
		Dilution Factor: 1		Analysis Time..: 20:13	DL.....: 0.50	
Cobalt	3.0	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AT
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 1.0	
Chromium	4.2 B	5.0	ug/L	SW846 6020	02/11-02/28/11	MEAFW1AU
		Dilution Factor: 1		Analysis Time..: 20:13	DL.....: 1.5	
Copper	12.1	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AV
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 1.0	
Iron	1910	100	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AW
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 25.0	
Nickel	2.4 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AX
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A0
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A1
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 2.0	
Selenium	5.0 U	6.0	ug/L	SW846 6020	02/11-02/25/11	MEAFW1A2
		Dilution Factor: 2		Analysis Time..: 18:54	DL.....: 2.0	
Thallium	0.70 B	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A3
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 0.50	
Vanadium	11.3 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A4
		Dilution Factor: 1		Analysis Time..: 19:32	DL.....: 3.0	

(Continued on next page)

171

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211-SD

TOTAL Metals

Lot-Sample #...: G1B100573-006 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	2010	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1D7
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 480	
Barium	68.8 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1D8
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1D9
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 3.0	
Calcium	604000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EA
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 500	
Potassium	186000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EC
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 930	
Magnesium	698000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1ED
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 400	
Manganese	59.0 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EE
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 25.0	
Sodium	5740000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EF
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EG
		Dilution Factor: 10		Analysis Time..: 16:26	DL.....: 30.0	

NOTE(S):

B Estimated result. Resolt is less than RL.

172

CH2M Hill Inc

Client Sample ID: VEECA-5SW04-0211-SD

DISSOLVED Metals

Lot-Sample #...: G1B100573-006 Matrix.....: WATER
Date Sampled...: 02/09/11 11:35 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A5
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 0.30	
Arsenic	1.1 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A6
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFW1A7
		Dilution Factor: 20		Analysis Time..: 19:42	DL.....: 10.0	
Cobalt	2.0 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1A8
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AA
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 1.5	
Copper	10.5	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AC
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 1.0	
Iron	40.9 B	100	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AD
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 25.0	
Nickel	5.3	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AE
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AF
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AG
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 2.0	
Selenium	19.2 B	30.0	ug/L	SW846 6020	02/11-03/03/11	MEAFW1AH
		Dilution Factor: 10		Analysis Time..: 13:04	DL.....: 10.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AJ
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 0.50	
Vanadium	3.4 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFW1AK
		Dilution Factor: 1		Analysis Time..: 21:06	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VRECA-5SW04-0211-SD

DISSOLVED Metals

Lot-Sample #...: G1B100573-006 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EH
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 480	
Barium	64.0 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EJ
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EK
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 3.0	
Calcium	560000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EL
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 500	
Potassium	179000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EM
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 930	
Magnesium	661000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EN
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EP
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 25.0	
Sodium	5300000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1EQ
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFW1ER
		Dilution Factor: 10		Analysis Time..: 16:56	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

174

CH2M Hill Inc

Client Sample ID: VKECA-5SW05-0211

TOTAL Metals

Lot-Sample #...: G1B100573-007 Matrix.....: WATER
Date Sampled...: 02/09/11 12:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AP
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 0.30	
Arsenic	1.9 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AQ
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFX1AR
		Dilution Factor: 20		Analysis Time..: 19:10	DL.....: 10.0	
Cobalt	2.9 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AT
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.0	
Chromium	6.2	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AU
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.5	
Copper	11.2	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AV
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.0	
Iron	2140	100	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AW
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 25.0	
Nickel	2.2 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AX
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A0
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A1
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 2.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A2
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A3
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 0.50	
Vanadium	13.2	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A4
		Dilution Factor: 1		Analysis Time..: 20:23	DL.....: 3.0	

(Continued on next page)

175

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211

TOTAL Metals

Lot-Sample #...: G1B100573-007 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045234						
Aluminum	2700	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1A9
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 480	
Barium	71.1 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CA
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CC
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 3.0	
Calcium	606000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CD
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 500	
Potassium	189000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CE
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 930	
Magnesium	699000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CF
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 400	
Manganese	71.2 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CG
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 25.0	
Sodium	5590000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CH
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CJ
		Dilution Factor: 10		Analysis Time..: 16:53	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

176

CH2M Hill Inc

Client Sample ID: VERCA-5SW05-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-007 Matrix.....: WATER
Date Sampled...: 02/09/11 12:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042166						
Silver	0.50 U	1.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A5
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 0.30	
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A6
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.0	
Cadmium	10.0 U	30.0	ug/L	SW846 6020	02/11-02/28/11	MEAFX1A7
		Dilution Factor: 20		Analysis Time..: 19:19	DL.....: 10.0	
Cobalt	1.9 B	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1A8
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.0	
Chromium	4.0 U	5.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AA
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.5	
Copper	9.9	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AC
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.0	
Iron	252	100	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AD
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 25.0	
Nickel	3.9	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AE
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.0	
Lead	1.0 U	2.5	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AF
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 0.60	
Antimony	4.0 U	6.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AG
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 2.0	
Selenium	18.3	3.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AH
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AJ
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 0.50	
Vanadium	5.3 B	12.0	ug/L	SW846 6020	02/11-02/24/11	MEAFX1AK
		Dilution Factor: 1		Analysis Time..: 21:40	DL.....: 3.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VEECA-5SW05-0211

DISSOLVED Metals

Lot-Sample #...: G1B100573-007 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1045189						
Aluminum	1000 U	2000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CK
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 480	
Barium	67.7 J	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CL
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 25.0	
Beryllium	10.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CM
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 3.0	
Calcium	581000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CN
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 500	
Potassium	187000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CP
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 930	
Magnesium	677000	5000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CQ
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 400	
Manganese	50.0 U	100	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CR
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 25.0	
Sodium	5490000	10000	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CT
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 2500	
Zinc	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEAFX1CU
		Dilution Factor: 10		Analysis Time..: 17:23	DL.....: 30.0	

NOTE(S):

B Estimated result. Result is less than RL.

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911SD

TOTAL Metals

Lot-Sample #...: G1B100573-008 Matrix.....: WATER
Date Sampled...: 02/09/11 07:20 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEA3X1A2
		Dilution Factor: 1		Analysis Time..: 20:27	DL.....: 1.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/24/11	MEA3X1A3
		Dilution Factor: 1		Analysis Time..: 20:27	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/24/11	MEA3X1A4
		Dilution Factor: 1		Analysis Time..: 20:27	DL.....: 0.50	
Prep Batch #...: 1045234						
Silver	2.0 U	5.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AE
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 0.84	
Aluminum	100 U	200	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AF
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 48.0	
Barium	5.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AG
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 2.5	
Beryllium	1.0 U	3.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AH
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 0.30	
Calcium	51.4 J	500	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AJ
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 50.0	
Cadmium	1.0 U	3.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AK
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 0.50	
Cobalt	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AL
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 3.0	
Chromium	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AM
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 1.2	
Copper	5.0 U	15.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AN
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 2.1	
Iron	26.7 J	100	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AP
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 20.0	

(Continued on next page)

CH2M Hill Inc

Client Sample ID: VKECA-EB01-020911SD

TOTAL Metals

Lot-Sample #...: G1B100573-008 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	250 U	1000	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AQ
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 93.0	
Magnesium	100 U	500	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AR
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 40.0	
Manganese	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AT
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 2.5	
Sodium	568 J	1000	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AU
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 250	
Nickel	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AV
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 2.4	
Lead	5.0 U	10.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AW
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 2.5	
Antimony	20.0 U	30.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1AX
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 9.8	
Vanadium	5.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1A0
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 1.9	
Zinc	10.0 U	20.0	ug/L	SW846 6010B	02/14-02/16/11	MEA3X1A1
		Dilution Factor: 1		Analysis Time..: 16:02	DL.....: 3.0	

NOTE(S):

J Estimated result. Result is less than RL.

186

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B100573, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B100573. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Exp	Perc	TMetals 6010B	DMetals 6010B	TMetals 6020	DMetals 6020	THxCr	DHxCr
VECCA-5SW01-021	G1B00573-001	water	X	X	X	X	X	X	X	X
VEECA-5SW02-021	G1B100573-002	water	X	X	X	X	X	X	X	X
VEECA-5SW02P-0211	G1B100573-003	water	X	X	X	X	X	X	X	X
VEECA-5SW03-021	G1B100573-004	water	X	X	X	X	X	X	X	X
VEECA-EB020911-SW	G1B100573-005	water	X	X	X	X	X	X	X	X
VEECA-5SW04-021	G1B100573-006	water	X	X	X	X	X	X	X	X
VEECA-5SW05-0211	G1B100573-007	water	X	X	X	X	X	X	X	X
VEECA-EB01-020911SD	G1B100573-008	water	X	X	X		X		X	
VEECA-5SW04-0211 MS	G1B100573-006MS	water	X	X	X	X	X	X	X	X
VEECA-5SW04-0211 MSD	G1B100573-006MSD	water	X	X	X	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB020911-SW and VEECA-EB01-020911SD-equipment blanks; and sample VEECA-5SW02P-0211-field duplicate of sample VEECA-5SW02-0211.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times

CH2M Hill Inc

Client Sample ID: VEECA-5SW01-0211

Dissolved HPLC

Lot-Sample #...: G1B100573-001 Work Order #...: MEAFP2AC Matrix.....: WATER
Date Sampled...: 02/09/11 09:25 Date Received..: 02/10/11
Prep Date.....: 02/22/11 Analysis Date..: 02/23/11
Prep Batch #...: 1053108 Analysis Time..: 17:48
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 051311

016A

Total & Dissolved Metals

One of the ICV standards associated with the samples exhibited a recovery above the upper QC limit of 110% at 115.1%. Qualifications were required.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Qualifications to the data were required.

Four samples exhibited differences between the total and dissolved results that were >50%. One analyte in each pair of samples required rejection based on Region II guidelines.

Total & Dissolved Hexavalent Chromium

All of the sample analyses exceeded the required 24-hour holding time but all were analyzed less than 48 hours out; therefore the reported results were qualified as estimated.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for the perchlorate fraction as pages were missing from the submitted data package. The laboratory was contacted and the requested information was supplied. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/9/11 and samples were received at the laboratory on 2/10/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Total & Dissolved Hexavalent Chromium

All samples exceeded the 24 hour holding time by approximately 30 hours. All reported results in the samples were qualified as estimated J/UJ with a qualifier code of HT.

Matrix Spike Recoveries

Total & Dissolved Metals

The matrix spike pairs submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-5SW04-0211 Total	aluminum	all total field samples	133/132	J+	MSH
VEECA-5SW04-0211 Dissolved	vanadium	all dissolved field samples	124/126	J+	MSH

Identification/Quantitation

Total & Dissolved Metals

The sample pairs listed in the following table exhibited one analyte each that had %Ds between the total and dissolved results that were greater than 50% when the dissolved result was higher than the total result and the dissolved result was greater than 5X the DL. Qualifications were required as noted based on Region II guidelines.

Total / Dissolved Pair ID	Analyte	%D	Qualifier	Q Code
VEECA-5SW04-0211 Total VEECA-5SW04-0211 Dissolved	nickel	121	R	OT
VEECA-5SW02-0211 Total VEECA-5SW02-0211 Dissolved	selenium	227	R	OT
VEECA-5SW03-0211 Total VEECA-5SW03-0211 Dissolved	selenium	412	R	OT
VEECA-5SW05-0211 Total VEECA-5SW05-0211 Dissolved	selenium	632	R	OT

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Total & Dissolved Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	sodium	+	J	CCH
all total metals field samples	aluminum	+	J	MSH
all dissolved metals field samples	vanadium	+	J	MSH
VEECA-5SW04-0211 Total, VEECA-5SW04-0211 Dissolved	nickel	+	R	OT
VEECA-5SW02-0211 Total, VEECA-5SW02-0211 Dissolved	selenium	+	R	OT
VEECA-5SW03-0211 Total, VEECA-5SW03-0211 Dissolved	selenium	+	R	OT
VEECA-5SW05-0211 Total, VEECA-5SW05-0211 Dissolved	selenium	+	R	OT

Total & Dissolved Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
all samples	hexavalent chromium	+/-	J/UJ	HT

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW02-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFQ
Matrix:	WATER	**Lab Sample ID:**	G1B100573002
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1960.0000	~~J~~	J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.5000	J		P
7440-39-3	Barium	67.6000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	591000.00			P
7440-47-3	Chromium	4.2000	J		P
7440-48-4	Cobalt	2.8000	J		P
7440-50-8	Copper	11.8000			P
7439-89-6	Iron	1700.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	686000.00			P
7439-96-5	Manganese	56.5000	J		P
7440-02-0	Nickel	2.0000	U		P
7440-09-7	Potassium	184000.00			P
7782-49-2	Selenium	~~2.2000~~	~~J~~	R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5570000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.1000			P
7440-66-6	Zinc	100.0000	U		P

JAC 4/2011

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/2011

CH2M Hill Inc
Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW02-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFQ
Matrix:	WATER	**Lab Sample ID:**	G1B100573002
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:10
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	64.7000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	576000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	10.3000			P
7439-89-6	Iron	62.7000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	686000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	1.2000	J		P
7440-09-7	Potassium	184000.00			P
7782-49-2	Selenium	~~7.2000~~		R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5620000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.4000	~~J~~	J MSH	P
7440-66-6	Zinc	100.0000	U		P

JAC 02011

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/2011

027

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SW03-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFT
Matrix:	WATER	**Lab Sample ID:**	G1B100573004
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:55
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	2990.0000		J MSH	P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	1.7000	J		P
7440-39-3	Barium	72.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	612000.00			P
7440-47-3	Chromium	7.5000			P
7440-48-4	Cobalt	3.0000			P
7440-50-8	Copper	11.5000			P
7439-89-6	Iron	2530.0000			P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	699000.00			P
7439-96-5	Manganese	77.5000	J		P
7440-02-0	Nickel	1.5000	J		P
7440-09-7	Potassium	190000.00			P
7782-49-2	Selenium	~~2.5000~~	~~U~~	R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5650000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.9000			P
7440-66-6	Zinc	100.0000	U		P

JAC 6/2011

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/2011

CH2M Hill Inc

Dissolved Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSW03-0211
Lot Number:	G1B100573	**Lab WorkOrder:**	MEAFT
Matrix:	WATER	**Lab Sample ID:**	G1B100573004
% Solids:	0.0	**Date/Time Collected:**	02/09/11 10:55
Units:	UG/L	**Date/Time Received:**	02/10/11 13:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1000.0000	U		P
7440-36-0	Antimony	4.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	62.4000	J		P
7440-41-7	Beryllium	10.0000	U		P
7440-43-9	Cadmium	10.0000	U		P
7440-70-2	Calcium	551000.00			P
7440-47-3	Chromium	4.0000	U		P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	10.2000			P
7439-89-6	Iron	49.7000	J		P
7439-92-1	Lead	1.0000	U		P
7439-95-4	Magnesium	652000.00			P
7439-96-5	Manganese	50.0000	U		P
7440-02-0	Nickel	1.5000	J		P
7440-09-7	Potassium	177000.00			P
7782-49-2	Selenium	~~12.8000~~		R OT	P
7440-22-4	Silver	0.5000	U		P
7440-23-5	Sodium	5230000.0		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.3000	✗	J MSH	P
7440-66-6	Zinc	100.0000	U		P

JAC 4/20/11

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 4/20/11

CH2M HILL VIEQUES ECA CTO-37

SDG G1B100573

Total & Dissolved Analyte Concentrations

Note: Comparison between total and dissolved results is made only when both of the following conditions is met: 1. the dissolved concentration is greater than the total concentration, AND 2. the dissolved concentration is greater than or equal to 5X the MDL. If %Difference is greater than 20% but less than 50% results are J, if >50% results are R.

Sample ID: VEECA-5SW02-0211 T **Duplicate Sample ID:** VEECA-5SW02-0211 D

Analyte	Sample Conc.	Duplicate Conc.	% Difference
Sodium	5570000	5620000	1%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: No action required.

Sample ID: VEECA-5SW04-0211 T **Duplicate Sample ID:** VEECA-5SW04-0211 D

Analyte	Sample Conc.	Duplicate Conc.	% Difference
Nickel	2.4	5.3	121%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action. Reject nickel in both samples.

Sample ID: VEECA-5SW02-0211 T **Duplicate Sample ID:** VEECA-5SW02-0211 D

Analyte	Sample Conc.	Duplicate Conc.	% Difference
selenium	2.2	7.2	227%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: Reject selenium in both samples

Sample ID: VEECA-5SW03-0211 T **Duplicate Sample ID:** VEECA-5SW03-0211 D

Analyte	Sample Conc.	Duplicate Conc.	% Difference
selenium	2.5	12.8	412%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: Reject selenium in both samples.

Sample ID: VEECA-5SW05-0211 T **Duplicate Sample ID:** VEECA-5SW05-0211 D

Analyte	Sample Conc.	Duplicate Conc.	% Difference
selenium	2.5	18.3	632%
			#DIV/0!
			#DIV/0!
			#DIV/0!
			#DIV/0!

Action: Reject selenium in both samples.

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B100574, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B100574. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-4SS01-0001-0211	G1B100574-001	soil			X	X	X
VEECA-4SS01P-0001-0211	G1B100574-003	soil			X	X	X
VEECA-1SB01-1H02-0211	G1B100574-003	soil	X	X	X	X	X
VEECA-1SB02-1H02-0211	G1B100574-004	soil	X	X	X	X	X
VEECA-1SB02P-1H02-0211	G1B100574-005	soil	X	X	X	X	X
VEECA-2SB07-0H2H-0211	G1B100574-006	soil	X	X	X	X	X
VEECA-2SB08-0204-0211	G1B100574-007	soil	X	X	X	X	X
VEECA-2SB09-4H6H-0211	G1B100574-008	soil	X	X	X	X	X
VEECA-2SB09P-4H6H-0211	G1B100574-009	soil	X	X	X	X	X
VEECA-EB01-020911-SS	G1B100574-010	water			X	X	X
VEECA-EB02-020911-SB	G1B100574-011	water	X	X	X	X	X
VEECA-4SS01-0001-0211 MS	G1B100574-001MS	soil			X	X	X
VEECA-4SS01-0001-0211 MSD	G1B100574-001 MSD	soil			X	X	X
VEECA-1SB01-1H02-0211 MS	G1B100574-003MS	soil	X	X	X	X	X
VEECA-1SB01-1H02-0211 MSD	G1B100574-003MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB01-020911-SS and VEECA-EB02-020911-SB-- equipment blanks; sample VEECA-4SS01P-0001-0211-field duplicate of sample VEECA-4SS01-0001-0211; sample VEECA-1SB02P-1H02-0211-field duplicate of sample VEECA-1SB02-1H02-0211; and

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

sample VEECA-2SB09P-4H6H-0211-field duplicate of sample VEECA-2SB09-4H6H-0211.

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications were required to the data.

Perchlorate

No qualifications were required to the data.

Metals

The submitted MS/MSD pairs exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

The serial dilution analysis exhibited two non-compliant %D. Results were qualified as estimated for the non-compliant analytes.

Two of the field duplicate pairs exhibited non-compliant RPDs. Qualifications were required in the field duplicate pairs only.

Please note that some results were reported with a laboratory qualifier G. This is to indicate that the reporting limit has been raised due to observed matrix interference. Also the laboratory used a qualifier of RLA to indicate that the reporting limit was raised due to dilution. These qualifiers have been crossed out and the results are reported as usable at the raised reporting limits without further qualification unless other QC issues are noted in this report.

Hexavalent Chromium

The rinse blank samples exceeded the required 24-hour holding time by approximately 34 hours. The reported results were qualified as estimated J/UJ.

Please note that some results were reported with a laboratory qualifier G. This is to indicate that the reporting limit has been raised due to observed matrix interference. These qualifiers have been crossed out and the results are reported as usable at the raised reporting limits without further qualification.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/8-9/11 and samples were received at the laboratory on 2/10/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Samples VEECA-EB01-020911-SS and VEECA-EB01-020911-SB exceeded the 24 hour holding time by approximately 34 hours; therefore the reported non-detect results in these field QC blanks were qualified as estimated J/UJ with a qualifier code of HT.

Matrix Spike Recoveries

Metals

The matrix spike pairs submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS/MSD ID	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SS01-0001-0211	antimony	all soil samples	44/44	J/UJ	MSL
	cadmium		78/77		
VEECA-1SB01-1H02-0211	aluminum	all soil samples	133/129	J	MSH

Serial Dilutions

Metals

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

SD	Analytes	Samples	%D	Q Flag	Q Code
VEECA-4SS01-0001-0211	magnesium	all soil samples	11.47	J/UJ	SD
	arsenic		10.3		

Field Duplicate

Metals

The field duplicate pairs submitted in this SDG exhibited non-compliant RPDs. The following table tabulates the non-compliant RPDs and required qualifications are noted. The qualifications apply to the field duplicate pairs only.

Field Dup Pair ID	Analyte	RPD	Qualifier	Q Code
VEECA-4SS01-0001 VEECA-4SS01P-0001	lead	62	J	FD
VEECA-1SB02-1H02-0211 VEECA-1SB02P-1H02-0211	aluminum chromium iron sodium	38 38 36 37	J	FD
VEECA-2SB09-4H6H-0211 VEECA-2SB09P-4H6H-0211	barium	99	J	FD

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	antimony cadmium	+/-	J/UJ	MSL
all soil samples	aluminum	+	J	MSH
all soil samples	arsenic magnesium	+/-	J/UJ	SD
VEECA-4SS01-0001 VEECA-4SS01P-0001	lead	+	J	FD
VEECA-1SB02-1H02-0211 VEECA-1SB02P-1H02-0211	aluminum* chromium iron sodium	+	J	FD
VEECA-2SB09-4H6H-0211 VEECA-2SB09P-4H6H-0211	barium	+	J	FD

**Final qualifier code for Al is MSH.*

Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
VEECA-EB01-020911-SS, VEECA-EB01-020911-SB	hexavalent chromium	-	J/UJ	HT

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

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020911-SB

HPLC

Lot-Sample #...: G1B100574-011 Work Order #...: MEAGA1A1 Matrix.....: WATER
Date Sampled...: 02/09/11 06:50 Date Received..: 02/10/11
Prep Date.....: 02/11/11 Analysis Date..: 02/24/11
Prep Batch #...: 1042184 Analysis Time..: 06:46
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.050 U	0.50	ug/L	0.025
1,3,5-Trinitrobenzene	0.050 U	0.099	ug/L	0.031
1,3-Dinitrobenzene	0.050 U	0.15	ug/L	0.050
2,4,6-Trinitrotoluene	0.050 U	0.15	ug/L	0.050
2,4-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2,6-Dinitrotoluene	0.050 U	0.15	ug/L	0.050
2-Amino-4,6-dinitrotoluene	0.099 U	0.30	ug/L	0.099
2-Nitrotoluene	0.099 U	0.99	ug/L	0.087
3-Nitrotoluene	0.099 U	0.50	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.050 U	0.15	ug/L	0.050
4-Nitrotoluene	0.099 U	0.99	ug/L	0.087
HMX	0.050 U	0.15	ug/L	0.036
Nitrobenzene	0.050 U	0.15	ug/L	0.050
Nitroglycerin	0.50 U	0.99	ug/L	0.33
PETN	0.50 U	0.99	ug/L	0.30
RDX	0.050 U	0.25	ug/L	0.036
Tetryl	0.050 U	0.15	ug/L	0.050

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(84 - 125)

WM 05/11/11

010

CH2M Hill Inc

Client Sample ID: VEECA-1SB01-1H02-0211

HPLC

Lot-Sample #...: G1B100574-003 Work Order #...: MEAF21A5 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:45 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 00:44
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

WM 05/11/11

011

CH2M Hill Inc

Client Sample ID: VEECA-1SB02-1H02-0211

HPLC

Lot-Sample #...: G1B100574-004 Work Order #...: MEAF31AG Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 03:00
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

VM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-1SB02P-1H02-0211

HPLC

Lot-Sample #...: G1B100574-005 Work Order #...: MEAF41AN Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 03:45
Dilution Factor: 1
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	99	(81 - 127)

LM 05/11/11

013

CH2M Hill Inc

Client Sample ID: VERCA-2SB07-0H2H-0211

HPLC

Lot-Sample #...: G1B100574-006 Work Order #...: MEAFS1AU Matrix.....: SOLID
Date Sampled...: 02/08/11 11:10 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 04:30
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	99	(81 - 127)

VM 05/11/11

014

CH2M Hill Inc

Client Sample ID: VEECA-2SB08-0204-0211

HPLC

Lot-Sample #...: G1B100574-007 Work Order #...: MEAF61A1 Matrix.....: SOLID
Date Sampled...: 02/08/11 12:00 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 05:15
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-2SB09-4H6H-0211

HPLC

Lot-Sample #...: G1B100574-008 Work Order #...: MEAF71A1 Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 06:00
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	99	(81 - 127)

MM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VERCA-2SB09P-4H6H-0211

HPLC

Lot-Sample #...: G1B100574-009 Work Order #...: MEAF81AC Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11
Prep Date.....: 02/18/11 Analysis Date..: 02/23/11
Prep Batch #...: 1049385 Analysis Time..: 06:45
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	100	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-1SB01-1B02-0211

HPLC

Lot-Sample #...:	G1B100574-003	**Work Order #...:**	MEAF21AA	**Matrix.....:**	SOLID
Date Sampled...:	02/08/11 09:45	**Date Received..:**	02/10/11		
Prep Date.....:	02/23/11	**Analysis Date..:**	02/26/11		
Prep Batch #...:	1054292	**Analysis Time..:**	03:27		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.41 U	5.1	ug/kg	0.26

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 04/2011

018

CH2M Hill Inc

Client Sample ID: VEECA-1SB02-1H02-0211

HPLC

Lot-Sample #...:	G1B100574-004	**Work Order #...:**	MEAF31AH	**Matrix.....:**	SOLID
Date Sampled...:	02/08/11 09:55	**Date Received..:**	02/10/11		
Prep Date.....:	02/23/11	**Analysis Date..:**	02/26/11		
Prep Batch #...:	1054292	**Analysis Time..:**	04:19		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ra		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	**0.42 U**	**5.2**	**ug/kg**	**0.27**

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

019

CH2M Hill Inc

Client Sample ID: VEECA-1SB02P-1H02-0211

HPLC

Lot-Sample #...: G1B100574-005 Work Order #...: MEAF41AP Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 05:12
Dilution Factor: 1.01
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.42 U	5.3	ug/kg	0.27

NOTE(S):
Results and reporting limits have been adjusted for dry weight.

VM 042111

020

CH2M Hill Inc

Client Sample ID: VEECA-2SB07-0H2H-0211

HPLC

Lot-Sample #...:	G1B100574-006	Work Order #...:	MEAF51AV	Matrix.....:	SOLID
Date Sampled...:	02/08/11 11:10	Date Received..:	02/10/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054292	Analysis Time..:	05:30		
Dilution Factor:	1.01				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.47 U	5.9	ug/kg	0.31

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042411

021

CH2M Hill Inc

Client Sample ID: VEECA-2SB08-0204-0211

HPLC

Lot-Sample #...: G1B100574-007 Work Order #...: MEAF61A2 Matrix.....: SOLID
Date Sampled...: 02/08/11 12:00 Date Received..: 02/10/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 05:47
Dilution Factor: 0.98
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.7	ug/kg	0.30

NOTE(S):
Results and reporting limits have been adjusted for dry weight.

WM
D42111

022

CH2M Hill Inc

Client Sample ID: VEECA-2SB09-4H6H-0211

HPLC

Lot-Sample #...:	G1B100574-008	Work Order #...:	MEAF71A2	Matrix.....:	SOLID
Date Sampled...:	02/08/11 13:15	Date Received..:	02/10/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054292	Analysis Time..:	06:05		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.47 U	5.9	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

023

CH2M Hill Inc

Client Sample ID: VEECA-2SB09P-4H6H-0211

HPLC

Lot-Sample #...: G1B100574-009 Work Order #...: MEAF81AD Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 06:22
Dilution Factor: 0.97
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.7	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

UM 04/21/11

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020911-SB

Dissolved HPLC

Lot-Sample #...: G1B100574-011 Work Order #...: MEAGA2A0 Matrix.....: WATER
Date Sampled...: 02/09/11 06:50 Date Received..: 02/10/11
Prep Date.....: 02/22/11 Analysis Date..: 02/23/11
Prep Batch #...: 1053108 Analysis Time..: 01:19
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

CH2M Hill Inc

Client Sample ID: VEECA-4SS01-0001-0211

TOTAL Metals

Lot-Sample #...: G1B100574-001 Matrix.....: SOLID
Date Sampled...: 02/08/11 08:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	23.8 J SD	2.9	mg/kg	SW846 6020	02/18-02/26/11	MEAF01A3
		Dilution Factor: 5		Analysis Time..: 19:41	DL.....: 0.88	
Selenium	2.6	1.8	mg/kg	SW846 6020	02/18-02/26/11	MEAF01A4
		Dilution Factor: 5		Analysis Time..: 19:41	DL.....: 0.58	
Thallium	0.27	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF01A5
		Dilution Factor: 1		Analysis Time..: 19:48	DL.....: 0.058	
Prep Batch #...: 1053190						
Silver	0.23 U	0.58	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AA
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.11	
Aluminum	36800 J MSH	23.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AC
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 6.5	
Barium	43.4	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AD
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.14	
Beryllium	0.84	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AE
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.035	
Calcium	121000 ~~RLA~~	292	mg/kg	SW846 6010B	02/22-02/24/11	MEAF01AF
		Dilution Factor: 5		Analysis Time..: 16:15	DL.....: 26.3	
Cadmium	0.092 ~~J~~ J MSL	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AG
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.035	
Cobalt	8.1	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AH
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.29	
Chromium	65.2	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AJ
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.16	
Copper	18.9	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AK
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.26	
Iron	37100 ~~G~~	58.4	mg/kg	SW846 6010B	02/22-02/24/11	MEAF01AL
		Dilution Factor: 5		Analysis Time..: 16:15	DL.....: 6.4	

(Continued on next page)

JLC 4/28/11

026

CH2M Hill Inc

Client Sample ID: VEECA-4SS01-0001-0211

TOTAL Metals

Lot-Sample #...: G1B100574-001 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	6180 ~~RLA~~	584	mg/kg	SW846 6010B	02/22-02/24/11	MEAF01AM
		Dilution Factor: 5		Analysis Time..: 16:15	DL.....: 58.4	
Magnesium	8330 J SD	58.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AN
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 5.3	
Manganese	581 ~~G~~	5.8	mg/kg	SW846 6010B	02/22-02/24/11	MEAF01AP
		Dilution Factor: 5		Analysis Time..: 16:15	DL.....: 1.5	
Sodium	282	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AQ
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 12.8	
Nickel	17.5	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AR
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.28	
Lead	29.7 J FD	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AT
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.30	
Antimony	2.3 ~~B~~ UJ MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AU
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 1.1	
Vanadium	65.6	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AV
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.22	
Zinc	28.7	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF01AW
		Dilution Factor: 1		Analysis Time..: 16:42	DL.....: 0.22	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 42811

027

CH2M Hill Inc

Client Sample ID: VEECA-4SS01P-0001-0211

TOTAL Metals

Lot-Sample #...: G1B100574-002 Matrix.....: SOLID
Date Sampled...: 02/08/11 08:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	23.7 J SD	3.0	mg/kg	SW846 6020	02/18-02/26/11	MEAF11AE
		Dilution Factor: 5		Analysis Time..: 19:49	DL.....: 0.89	
Selenium	2.7	1.8	mg/kg	SW846 6020	02/18-02/26/11	MEAF11AF
		Dilution Factor: 5		Analysis Time..: 19:49	DL.....: 0.59	
Thallium	0.26	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF11AG
		Dilution Factor: 1		Analysis Time..: 19:56	DL.....: 0.059	
Prep Batch #...: 1053190						
Silver	0.24 U	0.59	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AH
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.11	
Aluminum	37100 J MSH	23.6	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AJ
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 6.6	
Barium	44.2	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AK
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.14	
Beryllium	0.85	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AL
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.035	
Calcium	124000 ~~RLA~~	296	mg/kg	SW846 6010B	02/22-02/24/11	MEAF11AM
		Dilution Factor: 5		Analysis Time..: 16:27	DL.....: 26.6	
Cadmium	0.091 ~~J~~ J MSL	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AN
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.035	
Cobalt	8.3	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AP
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.30	
Chromium	65.9	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AQ
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.17	
Copper	19.2	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AR
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.26	
Iron	38300 ~~G~~	59.1	mg/kg	SW846 6010B	02/22-02/24/11	MEAF11AT
		Dilution Factor: 5		Analysis Time..: 16:27	DL.....: 6.5	

(Continued on next page)

JC 4/28/11

028

CH2M Hill Inc

Client Sample ID: VEECA-4SS01P-0001-0211

TOTAL Metals

Lot-Sample #...: G1B100574-002 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	5910	118	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A0
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 11.8	
Magnesium	8300 J SD	59.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AV
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 5.3	
Manganese	587 ~~G~~	5.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF11AW
		Dilution Factor: 5		Analysis Time..: 16:27	DL.....: 1.5	
Sodium	293	118	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11AX
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 13.0	
Nickel	17.7	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A0
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.28	
Lead	56.1 J FD	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A1
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.31	
Antimony	1.5 ~~J~~ J MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A2
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 1.1	
Vanadium	66.3	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A3
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.22	
Zinc	28.8	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF11A4
		Dilution Factor: 1		Analysis Time..: 17:00	DL.....: 0.22	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-1SB01-1H02-0211

TOTAL Metals

Lot-Sample #...: G1B100574-003 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:45 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	7.7 ~~U~~ UJ SD	12.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF21AE
		Dilution Factor: 25		Analysis Time..: 12:07	DL.....: 3.8	
Selenium	5.1 U	7.7	mg/kg	SW846 6020	02/18-02/28/11	MEAF21AF
		Dilution Factor: 25		Analysis Time..: 12:07	DL.....: 2.6	
Thallium	0.10 U	0.15	mg/kg	SW846 6020	02/18-02/22/11	MEAF21AG
		Dilution Factor: 1		Analysis Time..: 20:10	DL.....: 0.051	
Prep Batch #...: 1053190						
Silver	0.20 U	0.51	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AH
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.092	
Aluminum	402 J MSH	20.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AJ
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 5.7	
Barium	6.6	2.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AK
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.12	
Beryllium	0.10 U	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AL
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.031	
Calcium	318000 ~~RLA~~	256	mg/kg	SW846 6010B	02/22-02/24/11	MEAF21AM
		Dilution Factor: 5		Analysis Time..: 16:34	DL.....: 23.0	
Cadmium	0.10 ~~U~~ UJ MSH	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AN
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.031	
Cobalt	0.51 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AP
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.26	
Chromium	7.0	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AQ
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.14	
Copper	0.76 J	1.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AR
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.23	
Iron	675 ~~G~~	51.2	mg/kg	SW846 6010B	02/22-02/24/11	MEAF21AT
		Dilution Factor: 5		Analysis Time..: 16:34	DL.....: 5.6	

(Continued on next page)

JAC 4/28/11

030

CH2M Hill Inc

Client Sample ID: VEECA-1SB01-1H02-0211

TOTAL Metals

Lot-Sample #...: G1B100574-003 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	107	102	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AU
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 10.2	
Magnesium	14200 J SD	51.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AV
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 4.6	
Manganese	25.9 ~~G~~	5.1	mg/kg	SW846 6010B	02/22-02/24/11	MEAF21AW
		Dilution Factor: 5		Analysis Time..: 16:34	DL.....: 1.3	
Sodium	2180	102	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21AX
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 11.3	
Nickel	0.30 J	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21A0
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.25	
Lead	0.51 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21A1
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.27	
Antimony	2.0 ~~J~~ UJ/MSL	3.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21A2
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.96	
Vanadium	3.4	2.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21A3
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.19	
Zinc	0.69 J	2.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF21A4
		Dilution Factor: 1		Analysis Time..: 17:02	DL.....: 0.19	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

031

CH2M Hill Inc

Client Sample ID: VEECA-1SB02-1H02-0211

TOTAL Metals

Lot-Sample #...: G1B100574-004 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	7.8 ~~U~~ UJ SD	13.1	mg/kg	SW846 6020	02/18-02/28/11	MEAF31AL
		Dilution Factor: 25		Analysis Time..: 12:17	DL.....: 3.9	
Selenium	5.2 U	7.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF31AM
		Dilution Factor: 25		Analysis Time..: 12:17	DL.....: 2.6	
Thallium	0.10 U	0.16	mg/kg	SW846 6020	02/18-02/22/11	MEAF31AN
		Dilution Factor: 1		Analysis Time..: 20:19	DL.....: 0.052	
Prep Batch #...: 1053190						
Silver	0.21 U	0.52	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AP
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.094	
Aluminum	258 J MSH	20.9	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AQ
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 5.9	
Barium	4.3	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AR
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.13	
Beryllium	0.10 U	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AT
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.031	
Calcium	218000 ~~RLA~~	261	mg/kg	SW846 6010B	02/22-02/24/11	MEAF31AU
		Dilution Factor: 5		Analysis Time..: 16:42	DL.....: 23.5	
Cadmium	0.10 ~~U~~ UJ MSL	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AV
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.031	
Cobalt	0.52 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AW
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.26	
Chromium	4.7 J FD	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AX
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.15	
Copper	0.45 J	1.6	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31A0
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.23	
Iron	483 ~~G~~ J FD	52.3	mg/kg	SW846 6010B	02/22-02/24/11	MEAF31A1
		Dilution Factor: 5		Analysis Time..: 16:42	DL.....: 5.8	

(Continued on next page)

JAC 4/28/11

032

CH2M Hill Inc

Client Sample ID: VEECA-1SB02-1H02-0211

TOTAL Metals

Lot-Sample #...: G1B100574-004 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	80.3 J	105	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31A2
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 10.5	
Magnesium	10200 J D	52.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31A3
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 4.7	
Manganese	19.5 ~~G~~	5.2	mg/kg	SW846 6010B	02/22-02/24/11	MEAF31A4
		Dilution Factor: 5		Analysis Time..: 16:42	DL.....: 1.3	
Sodium	1490 J D	105	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31A5
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 11.5	
Nickel	0.52 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AA
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.25	
Lead	2.6 U ~~G~~	5.2	mg/kg	SW846 6010B	02/22-02/24/11	MEAF31AC
		Dilution Factor: 5		Analysis Time..: 16:42	DL.....: 1.4	
Antimony	2.1 ~~U~~ UJ MDL	3.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AD
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.98	
Vanadium	2.6	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AE
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.20	
Zinc	0.36 J	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF31AF
		Dilution Factor: 1		Analysis Time..: 17:09	DL.....: 0.20	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JC 4/28/11

033

CH2M Hill Inc

Client Sample ID: VEECA-1SB02P-1802-0211

TOTAL Metals

Lot-Sample #...: G1B100574-005 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	7.8 ~~U~~ UJ SD	13.1	mg/kg	SW846 6020	02/18-02/28/11	MEAF41AR
		Dilution Factor: 25		Analysis Time..: 12:21	DL.....: 3.9	
Selenium	5.2 U	7.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF41AT
		Dilution Factor: 25		Analysis Time..: 12:21	DL.....: 2.6	
Thallium	0.10 U	0.16	mg/kg	SW846 6020	02/18-02/22/11	MEAF41AU
		Dilution Factor: 1		Analysis Time..: 20:21	DL.....: 0.052	
Prep Batch #...: 1053190						
Silver	0.21 U	0.52	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AV
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.094	
Aluminum	380 J MSH	20.9	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AW
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 5.8	
Barium	6.1	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AX
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.13	
Beryllium	0.10 U	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41A0
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.031	
Calcium	312000 ~~RLA~~	261	mg/kg	SW846 6010B	02/22-02/24/11	MEAF41A1
		Dilution Factor: 5		Analysis Time..: 16:45	DL.....: 23.5	
Cadmium	0.10 ~~U~~ UJ MSL	0.31	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41A2
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.031	
Cobalt	0.52 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41A3
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.26	
Chromium	6.9 J FD	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41A4
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.15	
Copper	0.66 J	1.6	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AA
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.23	
Iron	696 ~~J~~ J FD	52.2	mg/kg	SW846 6010B	02/22-02/24/11	MEAF41AC
		Dilution Factor: 5		Analysis Time..: 16:45	DL.....: 5.7	

(Continued on next page)

JAC 4/28/11

034

CH2M Hill Inc

Client Sample ID: VEECA-1SB02P-1H02-0211

TOTAL Metals

Lot-Sample #...: G1B100574-005 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	107	104	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AD
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 10.4	
Magnesium	13900 J SD	52.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AE
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 4.7	
Manganese	24.8 ~~G~~	5.2	mg/kg	SW846 6010B	02/22-02/24/11	MEAF41AF
		Dilution Factor: 5		Analysis Time..: 16:45	DL.....: 1.3	
Sodium	2160 J SD	104	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AG
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 11.5	
Nickel	0.26 J	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AH
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.25	
Lead	0.52 U	1.0	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AJ
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.27	
Antimony	2.1 ~~U~~ UJ MS	3.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AK
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.98	
Vanadium	3.6	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AL
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.20	
Zinc	0.57 J	2.1	mg/kg	SW846 6010B	02/22-02/23/11	MEAF41AM
		Dilution Factor: 1		Analysis Time..: 17:12	DL.....: 0.20	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-2SB07-0H2H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-006 Matrix.....: SOLID
Date Sampled...: 02/08/11 11:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	8.8 U UJ SD	14.6	mg/kg	SW846 6020	02/18-02/28/11	MEAF51AX
		Dilution Factor: 25		Analysis Time..: 12:24	DL.....: 4.4	
Selenium	5.8 U	8.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF51A0
		Dilution Factor: 25		Analysis Time..: 12:24	DL.....: 2.9	
Thallium	0.12 U	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF51A1
		Dilution Factor: 1		Analysis Time..: 20:24	DL.....: 0.058	
Prep Batch #...: 1053190						
Silver	0.23 U	0.58	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51A2
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.11	
Aluminum	12600 J MSH	23.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51A3
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 6.5	
Barium	30.2	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51A4
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.14	
Beryllium	0.12 U	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AA
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.035	
Calcium	248000 RLA	292	mg/kg	SW846 6010B	02/22-02/24/11	MEAF51AC
		Dilution Factor: 5		Analysis Time..: 16:47	DL.....: 26.3	
Cadmium	0.092 J MSL	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AD
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.035	
Cobalt	8.4	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AE
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.29	
Chromium	26.8	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AF
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.16	
Copper	14.3	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AG
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.26	
Iron	17400 G	58.4	mg/kg	SW846 6010B	02/22-02/24/11	MEAF51AH
		Dilution Factor: 5		Analysis Time..: 16:47	DL.....: 6.4	

(Continued on next page)

JAC 42811

036

CH2M Hill Inc

Client Sample ID: VEECA-2SB07-0H2H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-006 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	1750	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AJ
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 11.7	
Magnesium	4880 J SD	58.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AK
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 5.3	
Manganese	592 G	5.8	mg/kg	SW846 6010B	02/22-02/24/11	MEAF51AL
		Dilution Factor: 5		Analysis Time..: 16:47	DL.....: 1.5	
Sodium	2040	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AM
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 12.8	
Nickel	10.8	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AN
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.28	
Lead	2.9 U G	5.8	mg/kg	SW846 6010B	02/22-02/24/11	MEAF51AP
		Dilution Factor: 5		Analysis Time..: 16:47	DL.....: 1.5	
Antimony	2.3 U US MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AQ
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 1.1	
Vanadium	73.1	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AR
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.22	
Zinc	15.5	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF51AT
		Dilution Factor: 1		Analysis Time..: 17:15	DL.....: 0.22	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JMC 4/28/11

037

CH2M Hill Inc

Client Sample ID: VEECA-2SB08-0204-0211

TOTAL Metals

Lot-Sample #...: G1B100574-007 Matrix.....: SOLID
Date Sampled...: 02/08/11 12:00 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	71.8 J SD	2.9	mg/kg	SW846 6020	02/18-02/26/11	MEAF61A4
		Dilution Factor: 5		Analysis Time..: 20:34	DL.....: 0.88	
Selenium	1.2 U	1.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF61AA
		Dilution Factor: 5		Analysis Time..: 13:17	DL.....: 0.58	
Thallium	0.12 U	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF61AC
		Dilution Factor: 1		Analysis Time..: 20:38	DL.....: 0.058	
Prep Batch #...: 1053190						
Silver	0.23 U	0.58	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AD
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.11	
Aluminum	9360 J MSH	23.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AE
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 6.5	
Barium	40.8	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AF
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.14	
Beryllium	0.12 U	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AG
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.035	
Calcium	261000 ~~RLA~~	292	mg/kg	SW846 6010B	02/22-02/24/11	MEAF61AH
		Dilution Factor: 5		Analysis Time..: 16:50	DL.....: 26.3	
Cadmium	0.048 ~~J~~ J MS Lo	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AJ
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.035	
Cobalt	7.3	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AK
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.29	
Chromium	17.2	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AL
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.16	
Copper	9.5	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AM
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.26	
Iron	14900 ~~G~~	58.4	mg/kg	SW846 6010B	02/22-02/24/11	MEAF61AN
		Dilution Factor: 5		Analysis Time..: 16:50	DL.....: 6.4	

(Continued on next page)

QAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-2SB08-0204-0211

TOTAL Metals

Lot-Sample #...: G1B100574-007 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	873	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AP
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 11.7	
Magnesium	6190 J SD	58.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AQ
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 5.3	
Manganese	212 ~~G~~	5.8	mg/kg	SW846 6010B	02/22-02/24/11	MEAF61AR
		Dilution Factor: 5		Analysis Time..: 16:50	DL.....: 1.5	
Sodium	1450	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AT
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 12.6	
Nickel	7.1	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AU
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.28	
Lead	2.9 U ~~G~~	5.8	mg/kg	SW846 6010B	02/22-02/24/11	MEAF61AV
		Dilution Factor: 5		Analysis Time..: 16:50	DL.....: 1.5	
Antimony	2.3 ~~U~~ UJ MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AW
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 1.1	
Vanadium	57.4	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61AX
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.22	
Zinc	15.4	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF61A0
		Dilution Factor: 1		Analysis Time..: 17:17	DL.....: 0.22	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JBC 42811

CH2M Hill Inc

Client Sample ID: VEECA-2SB09-4H6H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-008 Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	1.8 ~~U~~ UJ SD	2.9	mg/kg	SW846 6020	02/18-02/26/11	MEAF71A4
		Dilution Factor: 5		Analysis Time..: 20:37	DL.....: 0.88	
Selenium	1.2 U	1.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF71AA
		Dilution Factor: 5		Analysis Time..: 13:20	DL.....: 0.59	
Thallium	0.12 U	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF71AC
		Dilution Factor: 1		Analysis Time..: 20:41	DL.....: 0.059	
Prep Batch #...: 1053190						
Silver	0.23 U	0.59	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AD
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.11	
Aluminum	12100 J MSH	23.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AE
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 6.6	
Barium	133 J PD	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AF
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.14	
Beryllium	0.12 U	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AG
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.035	
Calcium	212000 ~~RLA~~	293	mg/kg	SW846 6010B	02/22-02/24/11	MEAF71AH
		Dilution Factor: 5		Analysis Time..: 16:52	DL.....: 26.3	
Cadmium	0.23 ~~J~~ J MSL	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AJ
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.035	
Cobalt	8.4	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AK
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.29	
Chromium	28.8	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AL
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.16	
Copper	11.0	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AM
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.26	
Iron	20100 ~~G~~	58.5	mg/kg	SW846 6010B	02/22-02/24/11	MEAF71AN
		Dilution Factor: 5		Analysis Time..: 16:52	DL.....: 6.4	

(Continued on next page)

JAC 4/28/11

040

CH2M Hill Inc

Client Sample ID: VEECA-2SB09-4H6H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-008 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	564	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AP
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 11.7	
Magnesium	5100 J SD	58.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AQ
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 5.3	
Manganese	550 G	5.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF71AR
		Dilution Factor: 5		Analysis Time..: 16:52	DL.....: 1.5	
Sodium	2220	117	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AT
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 12.9	
Nickel	9.1	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AU
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.28	
Lead	2.9 U G	5.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF71AV
		Dilution Factor: 5		Analysis Time..: 16:52	DL.....: 1.5	
Antimony	2.3 U MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AW
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 1.1	
Vanadium	72.0	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71AX
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.22	
Zinc	18.3	2.3	mg/kg	SW846 6010B	02/22-02/23/11	MEAF71A0
		Dilution Factor: 1		Analysis Time..: 17:20	DL.....: 0.22	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JLC 4/28/11

041

CH2M Hill Inc

Client Sample ID: VEECA-2SB09P-4H6H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-009 Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1049163						
Arsenic	1.8 U UJ SD	2.9	mg/kg	SW846 6020	02/18-02/26/11	MEAF81AF
		Dilution Factor: 5		Analysis Time..: 20:40	DL.....: 0.88	
Selenium	1.2 U	1.8	mg/kg	SW846 6020	02/18-02/28/11	MEAF81AG
		Dilution Factor: 5		Analysis Time..: 13:26	DL.....: 0.59	
Thallium	0.12 U	0.18	mg/kg	SW846 6020	02/18-02/22/11	MEAF81AH
		Dilution Factor: 1		Analysis Time..: 20:44	DL.....: 0.059	
Prep Batch #...: 1053190						
Silver	0.24 U	0.59	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AJ
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.11	
Aluminum	14200 J MSH	23.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AK
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 6.6	
Barium	44.7 J FD	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AL
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.14	
Beryllium	0.12 U	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AM
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.035	
Calcium	218000 RLA	294	mg/kg	SW846 6010B	02/22-02/24/11	MEAF81AN
		Dilution Factor: 5		Analysis Time..: 16:55	DL.....: 26.5	
Cadmium	0.26 J MSL	0.35	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AP
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.035	
Cobalt	9.2	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AQ
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.29	
Chromium	33.1	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AR
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.16	
Copper	11.9	1.8	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AT
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.26	
Iron	23000 G	58.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF81AU
		Dilution Factor: 5		Analysis Time..: 16:55	DL.....: 6.5	

(Continued on next page)

JAC 4/28/11

042

CH2M Hill Inc

Client Sample ID: VEECA-2SB09P-4H6H-0211

TOTAL Metals

Lot-Sample #...: G1B100574-009 Matrix.....: SOLID

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	679	118	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AV
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 11.8	
Magnesium	5440 J SD	58.9	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AW
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 5.3	
Manganese	562 ~~G~~	5.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF81AX
		Dilution Factor: 5		Analysis Time..: 16:55	DL.....: 1.5	
Sodium	2510	118	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81A0
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 13.0	
Nickel	9.6	1.2	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81A1
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.28	
Lead	2.9 U ~~G~~	5.9	mg/kg	SW846 6010B	02/22-02/24/11	MEAF81A2
		Dilution Factor: 5		Analysis Time..: 16:55	DL.....: 1.5	
Antimony	2.4 ~~B~~ VJ MSL	3.5	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81A3
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 1.1	
Vanadium	78.8	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81A4
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.22	
Zinc	19.5	2.4	mg/kg	SW846 6010B	02/22-02/23/11	MEAF81AA
		Dilution Factor: 1		Analysis Time..: 17:22	DL.....: 0.22	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

RLA The reporting limit for this analyte is elevated due to sample dilution.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JC 4281

043

CH2M Hill Inc

Client Sample ID: VEECA-EB01-020911-SS

TOTAL Metals

Lot-Sample #...: G1B100574-010 Matrix.....: WATER
Date Sampled...: 02/09/11 06:45 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/25/11	MEAF91AX
		Dilution Factor: 1		Analysis Time..: 01:29	DL.....: 1.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/25/11	MEAF91A0
		Dilution Factor: 1		Analysis Time..: 01:29	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/25/11	MEAF91A1
		Dilution Factor: 1		Analysis Time..: 01:29	DL.....: 0.50	
Prep Batch #...: 1042174						
Silver	2.0 U	5.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AA
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 0.84	
Aluminum	100 U	200	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AC
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 48.0	
Barium	5.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AD
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 2.5	
Beryllium	1.0 U	3.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AE
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 0.30	
Calcium	94.1 J	500	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AF
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 50.0	
Cadmium	1.0 U	3.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AG
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 0.50	
Cobalt	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AH
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 3.0	
Chromium	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AJ
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 1.2	
Copper	5.0 U	15.0	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AK
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 2.1	
Iron	50.0 U	100	ug/L	SW846 6010B	02/11-02/14/11	MEAF91AL
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 20.0	

(Continued on next page)

JAC 42811

CH2M Hill Inc

Client Sample ID: VERCA-EB01-020911-SS

TOTAL Metals

Lot-Sample #...: G1B100S74-010 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	124 J,B	1000	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AM
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 93.0	
Magnesium	100 U	500	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AN
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 40.0	
Manganese	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AP
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 2.5	
Sodium	250 U	1000	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AQ
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 250	
Nickel	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AR
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 2.4	
Lead	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AT
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 2.5	
Antimony	20.0 U	30.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AU
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 9.8	
Vanadium	5.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AV
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 1.9	
Zinc	10.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MKAF91AW
		Dilution Factor: 1		Analysis Time..: 17:11	DL.....: 3.0	

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. Analyte detected at a reportable level in blank.

JLC 42811

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020911-SB

TOTAL Metals

Lot-Sample #...: G1B100574-011 Matrix.....: WATER
Date Sampled...: 02/09/11 06:50 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1042156						
Arsenic	2.0 U	3.0	ug/L	SW846 6020	02/11-02/25/11	MEAGA1A2
		Dilution Factor: 1		Analysis Time..: 01:32	DL.....: 1.0	
Selenium	2.5 U	3.0	ug/L	SW846 6020	02/11-02/25/11	MEAGA1A3
		Dilution Factor: 1		Analysis Time..: 01:32	DL.....: 1.0	
Thallium	1.0 U	1.5	ug/L	SW846 6020	02/11-02/25/11	MEAGA1A4
		Dilution Factor: 1		Analysis Time..: 01:32	DL.....: 0.50	
Prep Batch #...: 1042174						
Silver	2.0 U	5.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AA
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 0.84	
Aluminum	100 U	200	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AC
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 48.0	
Barium	5.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AD
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 2.5	
Beryllium	1.0 U	3.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AE
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 0.30	
Calcium	116 J	500	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AF
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 50.0	
Cadmium	1.0 U	3.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AG
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 0.50	
Cobalt	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AH
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 3.0	
Chromium	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AJ
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 1.2	
Copper	5.0 U	15.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AK
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 2.1	
Iron	50.0 U	100	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AL
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 20.0	

(Continued on next page)

JC 42811

CH2M Hill Inc

Client Sample ID: VEECA-EB02-020911-SB

TOTAL Metals

Lot-Sample #...: G1B100S74-011 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	125 J,B	1000	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AM
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 93.0	
Magnesium	100 U	500	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AN
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 40.0	
Manganese	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AP
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 2.5	
Sodium	250 U	1000	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AQ
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 250	
Nickel	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AR
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 2.4	
Lead	5.0 U	10.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AT
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 2.5	
Antimony	20.0 U	30.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AU
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 9.8	
Vanadium	5.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AV
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 1.9	
Zinc	10.0 U	20.0	ug/L	SW846 6010B	02/11-02/14/11	MEAGA1AW
		Dilution Factor: 1		Analysis Time..: 17:23	DL.....: 3.0	

NOTE(S):

J Estimated result. Result is less than RL.

B Method blank contamination. Analyte detected at a reportable level in blank.

JAC 42811

047

CH2M Hill Inc

Client Sample ID: VEECA-4SS01-0001-0211

General Chemistry

Lot-Sample #...: G1B100574-001 Work Order #...: MEAF0 Matrix.....: SOLID
Date Sampled...: 02/08/11 08:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS.	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	9.2	0.12	--	SW846 9045C	02/24/11	1055331
	Dilution Factor: 1			Analysis Time..: 16:33	DL.....: 0.12	
Hexavalent Chromium	0.067 J,G	0.29	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 5			Analysis Time..: 17:27	DL.....: 0.058	
Percent Moisture	14.3	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:39	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 2/28/11

CH2M Hill Inc

Client Sample ID: VEECA-4SS01P-0001-0211

General Chemistry

Lot-Sample #...: G1B100574-002 Work Order #...: MEAF1 Matrix.....: SOLID
Date Sampled...: 02/08/11 08:30 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.067 J,~~G~~	0.30	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 5			Analysis Time..: 17:28	DL.....: 0.059	
Percent Moisture	15.4	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:39	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

049

CH2M Hill Inc

Client Sample ID: VEECA-1SB01-1H02-0211

General Chemistry

Lot-Sample #...: G1B100574-003 Work Order #...: MEAF2 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:45 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	9.1	0.10	--	SW846 9045C	02/24/11	1055331
		Dilution Factor: 1		Analysis Time..: 16:41	DL.....: 0.10	
Hexavalent Chromium	0.026 U	0.051	mg/kg	SW846 7196A	02/25/11	1055327
		Dilution Factor: 1		Analysis Time..: 17:29	DL.....: 0.010	
Percent Moisture	2.3	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
		Dilution Factor: 1		Analysis Time..: 07:39	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/28/11

050

CH2M Hill Inc

Client Sample ID: VEECA-1SB02-1B02-0211

General Chemistry

Lot-Sample #...: G1B100574-004 Work Order #...: MEAF3 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.026 U	0.052	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 1			Analysis Time..: 17:30	DL.....: 0.010	
Percent Moisture	4.4	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:39	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 42811

051

CH2M Hill Inc

Client Sample ID: VEECA-1SB02P-1H02-0211

General Chemistry

Lot-Sample #...: G1B100574-005 Work Order #...: MEAF4 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:55 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.026 U	0.052	mg/kg	SW846 7196A	02/25/11	1055327
		Dilution Factor: 1		Analysis Time..: 17:31	DL.....: 0.010	
Percent Moisture	4.3	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
		Dilution Factor: 1		Analysis Time..: 07:40	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JJC 4281

052

CH2M Hill Inc

Client Sample ID: VEECA-2SB07-0H2H-0211

General Chemistry

Lot-Sample #...: G1B100574-006 Work Order #...: MEAF5 Matrix.....: SOLID
Date Sampled...: 02/08/11 11:10 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.013 J	0.058	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 1			Analysis Time..: 17:31	DL.....: 0.012	
Percent Moisture	14.4	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:40	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

JAC 42811

CH2M Hill Inc

Client Sample ID: VEECA-2SB08-0204-0211

General Chemistry

Lot-Sample #...: G1B100574-007 Work Order #...: MEAF6 Matrix.....: SOLID
Date Sampled...: 02/08/11 12:00 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.15 U G	0.29	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 5			Analysis Time..: 17:32	DL.....: 0.058	
Percent Moisture	14.4	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:40	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JJC
42811

054

CH2M Hill Inc

Client Sample ID: VEECA-2SB09-4H6H-0211

General Chemistry

Lot-Sample #...: G1B100574-008 Work Order #...: MEAF7 Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.067 J,G	0.29	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 5			Analysis Time..: 17:32	DL.....: 0.059	
Percent Moisture	14.5	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:40	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

055

CH2M Hill Inc

Client Sample ID: VEECA-2SB09P-4H6H-0211

General Chemistry

Lot-Sample #...: G1B100574-009 Work Order #...: MEAF8 Matrix.....: SOLID
Date Sampled...: 02/08/11 13:15 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.15 U G	0.29	mg/kg	SW846 7196A	02/25/11	1055327
	Dilution Factor: 5			Analysis Time..: 17:33	DL.....: 0.059	
Percent Moisture	15.1	0.10	%	ASTM D 2216-90	02/26-02/28/11	1057089
	Dilution Factor: 1			Analysis Time..: 07:40	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/28/11

056

CH2M Hill Inc

Client Sample ID: VRECA-EB01-020911-SS

General Chemistry

Lot-Sample #...: G1B100574-010 **Work Order #...:** MEAF9 **Matrix.....:** WATER
Date Sampled...: 02/09/11 06:45 **Date Received..:** 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 J UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:27 DL.....: 2.0

JLC 42811

057

CH2M Hill Inc

Client Sample ID: VKECA-KB02-020911-SB

General Chemistry

Lot-Sample #...: G1B100574-011 Work Order #...: MEAGA Matrix.....: WATER
Date Sampled...: 02/09/11 06:50 Date Received..: 02/10/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:27 DL.....: 2.0

JC 42811

058

Case Narrative

TestAmerica West Sacramento Project Number G1B100574

General Comments

These samples were received at 1 and 0 degree Celsius with wet ice used as a cooling agent. The recommended 24 hour holding time was exceeded for hexavalent chromium for samples VEECA-EB01-020911-SS AND VEECA-EB02-020911-SB. Samples were received after the holding time was past.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 3, 4, 5, 6, 7, 8, 9
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MEQ8T1AC
SMCS: MEQ8T1AD

Samples: 9
The noted sample required manual integration on the perchlorate primary ion. The result is below the MDL and is reported as non-detected. Detailed information can be found in the Manual Integration Addendum section of this report.

WATER, 6850/DOD Handbook, Perchlorate
Sample: 11
In accordance with the requirements of method 6850, both a LCS and a SMCS were analyzed with the associated sample. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

Case Narrative

TestAmerica West Sacramento Project Number G1B100574

SOLID, 6010B/6020, Metals
1, 2, 3, 4, 5, 6, 7, 8, 9
The recoveries for the analytes Aluminum, Antimony, Cadmium, Calcium, Cobalt, Iron, Lead, Selenium and Manganese are outside the established control limits for the matrix spike and/or matrix spike duplicate (MS/MSD) associated with this batch. The concentrations of Aluminum, Calcium, Iron and Manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

An additional MS/MSD was performed for sample 3. The recoveries for Aluminum, Calcium and Iron exceeded the control limits. This MS/MSD exhibited greater than 4 times the added spike concentration for calcium and iron.

WATER, 6020, Total Metals
Samples: 10, 11
Manganese, Nickel, Cadmium, Barium and Zinc are verified trace impurities in the ICS-A solution. As such, they may not meet the acceptance criteria, but corrective action does not apply, per DoD QSM.

The method blank associated with this extraction batch has Potassium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

WATER, 7196A, Hexavalent Chromium
Samples: 10, 11
The noted samples were received in the laboratory after the recommended 24 hour holding time for the test had expired. The samples were analyzed after consultation with the client.

There are no other anomalies associated with this project.

G1B100574

GIB 100574

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Page 1 of 1

A

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1376

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8747 2112 6500

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) total for digestates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
1	VEECA-4SS01-0001-0211	02-08-11 0830	SS	1					1												
1	VEECA-4SS01-0001-0211-MS	02-08-11 0830	SS	1					1												No pH
1	VEECA-4SS01-0001-0211-MSD	02-08-11 0830	SS	1					1												No pH
2	VEECA-4SS01P-0001-0211	02-08-11 0830	SS	1					1												No pH
3	VEECA-1SB01-1H02-0211	02-08-11 0945	SB	1					1												
3	VEECA-1SB01-1H02-0211-MS	02-08-11 0945	SB	1				1													No pH
3	VEECA-1SB01-1H02-0211-MSD	02-08-11 0945	SB	1				1													No pH
4	VEECA-1SB02-1H02-0211	02-08-11 0955	SB	1				1													
5	VEECA-1SB02P-1H02-0211	02-08-11 0955	SB	1				1													No pH
6	VEECA-2SB07-0H2H-0211	02-08-11 1110	SB	1				1													
7	VEECA-2SB08-0204-0211	02-08-11 1200	SB	1				1													
8	VEECA-2SB09-4H6H-0211	02-08-11 1315	SB	1				1													
9	VEECA-2SB09P-4H6H-0211	02-08-11 1315	SB	1				1													

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:		Date/Time 02/09/11 1230	Received By: Fedex	Relinquished By.	Date/Time		Received By.
Relinquished By.		Date/Time 2-10-11 1330	Received By:	Relinquished By:	Date/Time		Received By:

G1B100574

G1B 100574

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St. Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8747 2112 6596

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) not for bpicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
	VEECA-EB01-020911-SS	02-09-11 0845	AQ	2											1	1					
	VEECA-EB02-020911-SB	02-09-11 0850	AQ	5									2	1	1	1					

Container: 2 of 16-oz glass; 1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO); 1 of 16 Oz glass jar; 2 of 1L Amber; 1 of 250ml HDPE; 1 of 500ml HDPE; 1 of 250ml HDPE; 1 of 500ml HDPE; 1 of 250ml HDPE; 1 of 500ml HDPE; 1 of 250ml HDPE

Test America Supplied Label: Soil MIS; 8330 Metals + pH, "Metals Only" for battery disposal area; Grain size; 8330 water; 8850 water; total metal water; total HexCr water; total metal water; total HexCr SW; Diss metals; Diss HexCr

Preservative: 4°C, headspace; 4°C, headspace; None; 4°C; field filter 0.2µm, headspace, 4°C no light; HNO3, 4°C; 4°C; HNO3, 4°C; 4°C; field filter 0.45µm, HNO3, 4°C; field filter 0.45µm, 4°C

COMMENTS: 28-Day Turn Around Time, non-hazard.

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
Dia Whitaker	02/09/11 1230	Fedex				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	2-9-11 1330					

DAW 02/09/11

TestAmerica West Sacramento (916) 373 - 5600

062

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: 61B100594

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	6										2									
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ			3	1	1	1	1	1	1											
125AGJ	3	1																		
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn										1	1									
500PJna																				
500PJzn/na																				
250PJ										1	2									
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT Hamtill PM KS LOG # 69315

LOT# (QUANTIMS ID) G1B100574 QUOTE# 38113 LOCATION WSC

Checked (✓)

DATE RECEIVED 2-10-11 TIME RECEIVED 1315 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: See temp. Sheet

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials: CB Date: 2-10-11

---

pH MEASURED ☑ YES ok ☐ ANOMALY ☐ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☐ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☐ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: CB Date: 2-10-11

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

064

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2MHill LOT# (QUANTIMS ID): G1B100574

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600160 ☑

COC #(S) 2-394 ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: NA CORRECTED ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 1 0 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: NA CORRECTED ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 0 AVERAGE: 0 CORRECTED 0 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S) ☐

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

Initials: ch Date: 2-10-11

065

G1B100574

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B100574

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2
			X											X	X									
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12

TestAmerica West Sacramento (916) 372-6200

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B100574

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? ✓ ___ ___

Are the chromatograms free of interferences? ✓ ___ ___

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/8-9/11 Prep 2/11-18/11

8.0 Holding Times Recd 2/10/11 Analy 2/23/24/11

8.1 Have any nitroaromatics and nitroamines technical

Temp 0°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? ✓ ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, only std dev and value [ ] ___ ✓

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [✓] ___ ___ 042511

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable) recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB-01-0211-SS
VEECA-EB01-0209/11-SB
NO

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ✓ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ✓ ___ ___

b. All blanks ✓ ___ ___

c. Matrix spike samples ✓ ___ ___

d. 5 pt. initial calibration standards ✓ ___ ___

e. Calibration verification standards ✓ ___ ___

f. Laboratory Control samples (LCS) ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ✓ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ✓ ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ✓ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ✓ ___ ___

YES NO N/A

ACTION i:If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). ✓ ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? ✓ ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence ✓ ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked CCal in sequence and compared RT to check stability -DK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines)

Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? ✓ ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ ✓ ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. ✓ ___ ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

VEECA-1SB02-1H02-0211
VEECA-1SB02P-1H02-0211 > no ⊕

VEECA-2SB09-4H6H-0211
VEECA-2SB09B-4H6H-0211 > no ⊕

Initial Calibration Date: 1/9/2011

RRF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 48.9000

Height of Compound	2445
Conc. of Compound	50
Calculated RF	48.900

Compound Name: nitrobenzene
Lab Value: 9.1

RF of STD 1	79.20
RF of STD 2	78.60
RF of STD 3	73.50
RF of STD 4	73.10
RF of STD 5	70.20
RF of STD 6	72.35
RF of STD 7	66.88
RF of STD 8	59.02
Calculated % RSD	9.1

Continuing Calibration File ID: 2/24/11, 9:37

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	9641
Conc. of Compound	100
Calculated RF	96.410

Compound Name: tertyl
Lab Value: 4

Average RF	100.000
RF of CCV	96.410
Calculated % D	4

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.81	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (sum)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (sum)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.126	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	

For all lots analyzed on LC12.

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/8-9/11
Received Date: 2/10/11
Prep Date: 2/22-23/11
Analysis Dates: 2/23-26/11
Cooler Temp: 0°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

All method and/or grinding blanks exhibited no contamination-no qualifications required. Associated QC blanks were: VEECA-EB01-020911-SB (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-1SB01-1H02-0211-all criteria met.

Field Duplicate Sample

A field duplicate was submitted for VEECA-1SB02-1H02-0211-no positive results were exhibited, no qualifications.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data and calculations were verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer L Marcello **Date:** 4/20/11

GIB100574

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

CLP Form I's not provided in this SDG

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?		[ ]	✓
(d) Cyanide?		[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments?			✓
Are preparation dates present on the sample preparation logs/bench sheets?			✓

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?			✓
	Mercury analysis(28 days) exceeded?			✓
	Other Metals analysis(180 days)exceeded?		✓	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

		YES	NO	N/A
A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	✓		
	Cyanide Analysis ≥ 12?			✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	✓		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B100574

2/23, 1702

ICP - AES	
SAMPLE ID	VEECA-1SB01-1H02-0211
ANALYTE	aluminum
Lab Value CONCENTRATION (mg/Kg)	402
AMOUNT FROM RAW DATA (ug/ml)	3.8886
SAMPLE SIZE (g)	0.99
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.977
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	402.035

2/26, 2034

ICP-MS	
SAMPLE ID	VEECA-2SB08-0204-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	71.8
AMOUNT FROM RAW DATA (ug/L)	120.488361
SAMPLE SIZE (g)	0.98
FINAL VOLUME (L)	0.1
DILUTION FACTOR	5
DRYNESS FACTOR	0.856
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	71.81502

	YES	NO	N/A
present and complete?	[ ]	✓	

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

Results forms are present not in CLP format

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]		
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]		
Are results on Form I'S reported by correct significant figures?	[✓]		
Are soil sample results on Form I's corrected for percent solids?	[✓]		
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]		
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]		
Are appropriate contractual quality control and Method qualifiers used?	[✓]		

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓]

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were performed as necessary but not noted on CLP type forms is present on results forms

A.1.11 **Initial Calibration**

A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[___]	✓	
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES(more than 2 point Calib.)?	[___]	___	✓
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

		YES	NO	N/A
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

		YES	NO	N/A
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[✓]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

LLQS

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis? LLQS	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

Resubs required — as these forms were not reported in original submission.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? * [✓] ___ ___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

* stds analyzed per method.

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:23 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B100574_LLQS.pdf; G1B050467_LLQS.pdf; G1B090534_LLQS.pdf; G1B230488_LLQS.pdf; G1B100573_LLQS.pdf

Jackie,
And here are the last 5 files of supplemental raw data for this issue.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE. This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	* [✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

criteria was met for bracketing stds.

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___
A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

no impact on results

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

YES NO N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

no impact on samples

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1B110000174B
Lot Number:	G1B100574	**Lab WorkOrder:**	MEA6X
Matrix:	WATER	**Lab Sample ID:**	G1B110000174B
Instrument Id:	T01	**Analysis Date/Time:**	2/14/2011 5:06:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	50.0000	U	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	110.0000	J	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

NQ - associated with rinse blanks only

U Result is less than the reporting limit. (RL)
J Estimated Result. Result is less than RL.

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples per SOP	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:**

For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%,reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note:Not required for Ca,Mg,K,and Na(both matrices);Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[___]	___	___
	On one of the SDG samples?	[___]	___	___
	For each concentration range (i.e.,low, med., high)?	[___]	___	___
	For each analytical Method (ICP-AES,ICP-MS, Hg, CN)used?	[___]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated(J)all the positive data for which a spiked sample was not analyzed.

2 spike pairs were analyzed

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	* ✓	[___]	___
*out due to abundance			
ACTION: If yes for any of the above, proceed as follows:			
If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (**NOTE**:Replace "N" with "J" or "R" as appropriate.)			
A.1.18 **Lab Duplicates) - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[✓]	___	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD
RPDs

VEECA-4SS01-0001-0211

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 08:30 **Date Received..:** 02/10/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: G1B100574-001 **Prep Batch #...:** 1049163									
Arsenic									
	23.8	22.2	42.8	mg/kg	85		SW846 6020	02/18-02/26/11	MEAF01CA
	23.8	22.5	42.5	mg/kg	83	0.62	SW846 6020	02/18-02/26/11	MEAF01CC
			Dilution Factor: 5						
			Analysis Time..: 19:35						
Selenium									
	2.6	22.2	21.4	mg/kg	85		SW846 6020	02/18-02/26/11	MEAF01CD
	2.6	22.5	20.5 N	mg/kg	79	4.7	SW846 6020	02/18-02/26/11	MEAF01CE
			Dilution Factor: 5						
			Analysis Time..: 19:35						
Thallium									
	0.27	5.56	6.01	mg/kg	103		SW846 6020	02/18-02/22/11	MEAF01CF
	0.27	5.61	6.25	mg/kg	106	3.9	SW846 6020	02/18-02/22/11	MEAF01CG
			Dilution Factor: 1						
			Analysis Time..: 19:42						
MS Lot-Sample #: G1B100574-001 **Prep Batch #...:** 1053190									
Aluminum									
	36800	236	47800 N	mg/kg	4690		SW846 6010B	02/22-02/23/11	MEAF01CK
	36800	227	46200 N	mg/kg	4150	3.5	SW846 6010B	02/22-02/23/11	MEAF01CL
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Antimony									
	2.3 U	59.0	26.5 N	mg/kg	44		SW846 6010B	02/22-02/23/11	MEAF01DK
	2.3 U	56.7	26.0 N	mg/kg	44	1.6	SW846 6010B	02/22-02/23/11	MEAF01DL
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Barium									
	43.4	236	251	mg/kg	88		SW846 6010B	02/22-02/23/11	MEAF01CM
	43.4	227	243	mg/kg	88	3.5	SW846 6010B	02/22-02/23/11	MEAF01CN
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Beryllium									
	0.84	5.90	5.70	mg/kg	82		SW846 6010B	02/22-02/23/11	MEAF01CP
	0.84	5.67	5.53	mg/kg	83	3.0	SW846 6010B	02/22-02/23/11	MEAF01CQ
			Dilution Factor: 1						
			Analysis Time..: 16:50						

NQ - MS OK

NQ - out due to abundance

JTW in all soil samples

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 08:30 **Date Received..:** 02/10/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Cadmium									
	0.092	5.90	4.67 N	mg/kg	78		SW846 6010B	02/22-02/23/11	MEAF01CU
	0.092	5.67	4.47 N	mg/kg	77	4.5	SW846 6010B	02/22-02/23/11	MEAF01CV
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Calcium									
	121000	5720	131000	mg/kg	163		SW846 6010B	02/22-02/24/11	MEAF01CR
			Qualifiers: N						
	121000	5720	133000	mg/kg	211	2.0	SW846 6010B	02/22-02/24/11	MEAF01CT
			Qualifiers: N						
			Dilution Factor: 5						
			Analysis Time..: 16:22						
Chromium									
	65.2	23.6	91.7	mg/kg	112		SW846 6010B	02/22-02/23/11	MEAF01C0
	65.2	22.7	90.4	mg/kg	111	1.4	SW846 6010B	02/22-02/23/11	MEAF01C1
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Cobalt									
	8.1	59.0	55.1	mg/kg	80		SW846 6010B	02/22-02/23/11	MEAF01CW
	8.1	56.7	53.0 N	mg/kg	79	3.9	SW846 6010B	02/22-02/23/11	MEAF01CX
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Copper									
	18.9	29.5	46.1	mg/kg	92		SW846 6010B	02/22-02/23/11	MEAF01C2
	18.9	28.3	45.2	mg/kg	93	1.9	SW846 6010B	02/22-02/23/11	MEAF01C3
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Iron									
	37100	114	39300 N	mg/kg	1910		SW846 6010B	02/22-02/24/11	MEAF01C4
	37100	114	41100 N	mg/kg	3420	4.3	SW846 6010B	02/22-02/24/11	MEAF01C5
			Dilution Factor: 5						
			Analysis Time..: 16:22						
Lead									
	29.7	59.0	84.6	mg/kg	93		SW846 6010B	02/22-02/23/11	MEAF01DH
	29.7	56.7	70.6 N	mg/kg	72	18	SW846 6010B	02/22-02/23/11	MEAF01DJ
			Dilution Factor: 1						
			Analysis Time..: 16:50						

J/UJ in all soil samples

NQ- out due to abundance

NQ- out due to abundance

NQ - MS OK

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 08:30 **Date Received..:** 02/10/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Magnesium									
	8330	5900	13600	mg/kg	89		SW846 6010B	02/22-02/23/11	MEAF01C8
	8330	5670	13400	mg/kg	89	1.6	SW846 6010B	02/22-02/23/11	MEAF01C9
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Manganese									
	581	57.2	644	mg/kg	109		SW846 6010B	02/22-02/24/11	MEAF01DA
	581	57.2	658 N	mg/kg	135	2.3	SW846 6010B	02/22-02/24/11	MEAF01DC
			Dilution Factor: 5						
			Analysis Time..: 16:22						
Nickel									
	17.5	59.0	66.0	mg/kg	82		SW846 6010B	02/22-02/23/11	MEAF01DF
	17.5	56.7	63.5	mg/kg	81	3.7	SW846 6010B	02/22-02/23/11	MEAF01DG
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Potassium									
	6180	5720	12400	mg/kg	109		SW846 6010B	02/22-02/24/11	MEAF01C6
	6180	5720	12500	mg/kg	111	0.86	SW846 6010B	02/22-02/24/11	MEAF01C7
			Dilution Factor: 5						
			Analysis Time..: 16:22						
Silver									
	0.23 U	5.90	5.18	mg/kg	88		SW846 6010B	02/22-02/23/11	MEAF01CH
	0.23 U	5.67	4.99	mg/kg	88	3.7	SW846 6010B	02/22-02/23/11	MEAF01CJ
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Sodium									
	282	5900	5470	mg/kg	88		SW846 6010B	02/22-02/23/11	MEAF01DD
	282	5670	5270	mg/kg	88	3.6	SW846 6010B	02/22-02/23/11	MEAF01DE
			Dilution Factor: 1						
			Analysis Time..: 16:50						
Vanadium									
	65.6	59.0	122	mg/kg	96		SW846 6010B	02/22-02/23/11	MEAF01DM
	65.6	56.7	121	mg/kg	98	0.93	SW846 6010B	02/22-02/23/11	MEAF01DN
			Dilution Factor: 1						
			Analysis Time..: 16:50						

NQ - MS OK

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 08:30 **Date Received..:** 02/10/11

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc									
	28.7	59.0	76.4	mg/kg	81		SW846 6010B	02/22-02/23/11	MEAF01DP
	28.7	56.7	74.0	mg/kg	80	3.1	SW846 6010B	02/22-02/23/11	MEAF01DQ

Dilution Factor: 1
Analysis Time..: 16:50

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

VECCA-1SB01-1H02-0211

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 09:45 **Date Received..:** 02/10/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: G1B100574-003 **Prep Batch #...:** 1049163							
Arsenic	90	(80 - 120)			SW846 6020	02/18-02/28/11	MEAF21CP
	87	(80 - 120)	6.3	(0-20)	SW846 6020	02/18-02/28/11	MEAF21CQ
		Dilution Factor: 25					
		Analysis Time..: 12:11					
Selenium	90	(80 - 120)			SW846 6020	02/18-02/28/11	MEAF21CR
	91	(80 - 120)	2.1	(0-20)	SW846 6020	02/18-02/28/11	MEAF21CT
		Dilution Factor: 25					
		Analysis Time..: 12:11					
Thallium	83	(80 - 120)			SW846 6020	02/18-02/22/11	MEAF21CU
	84	(80 - 120)	2.4	(0-20)	SW846 6020	02/18-02/22/11	MEAF21CV
		Dilution Factor: 1					
		Analysis Time..: 20:13					
MS Lot-Sample #: G1B100574-003 **Prep Batch #...:** 1053190							
Aluminum	133 N	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21C0
	129 N	(80 - 120)	1.8	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21C1
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Antimony	101	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21CA
	101	(80 - 120)	2.3	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21CC
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Barium	95	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21C2
	95	(80 - 120)	2.8	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21C3
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Beryllium	81	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21C4
	80	(80 - 120)	3.3	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21C5
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Cadmium	86	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21C8
	86	(80 - 120)	2.7	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21C9
		Dilution Factor: 1					
		Analysis Time..: 17:05					

J + flag in all field samples

(Continued on next page)

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B100574 Matrix.....: SOLID
Date Sampled...: 02/08/11 09:45 Date Received..: 02/10/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Calcium	260 N	(80 - 120)			SW846 6010B	02/22-02/24/11	MEAF21C6
	305 N	(80 - 120)	0.69	(0-20)	SW846 6010B	02/22-02/24/11	MEAF21C7
		Dilution Factor: 5					
		Analysis Time..: 16:37					
Chromium	89	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DD
	89	(80 - 120)	1.4	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DE
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Cobalt	87	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DA
	87	(80 - 120)	2.8	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DC
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Copper	97	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DF
	96	(80 - 120)	2.8	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DG
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Iron	142 N	(80 - 120)			SW846 6010B	02/22-02/24/11	MEAF21DH
	146 N	(80 - 120)	0.49	(0-20)	SW846 6010B	02/22-02/24/11	MEAF21DJ
		Dilution Factor: 5					
		Analysis Time..: 16:37					
Lead	84	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21A8
	84	(80 - 120)	1.5	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21A9
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Magnesium	99	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DM
	101	(80 - 120)	0.19	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DN
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Manganese	97	(80 - 120)			SW846 6010B	02/22-02/24/11	MEAF21DP
	96	(80 - 120)	0.38	(0-20)	SW846 6010B	02/22-02/24/11	MEAF21DQ
		Dilution Factor: 5					
		Analysis Time..: 16:37					
Nickel	85	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21A6
	84	(80 - 120)	2.7	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21A7
		Dilution Factor: 1					
		Analysis Time..: 17:05					

NQ-out due to abundance

NQ-out due to abundance

(Continued on next page)

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B100574 **Matrix.....:** SOLID
Date Sampled...: 02/08/11 09:45 **Date Received..:** 02/10/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	99	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DK
	98	(80 - 120)	2.3	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DL
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Silver	91	(75 - 120)			SW846 6010B	02/22-02/23/11	MEAF21CW
	90	(75 - 120)	2.4	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21CX
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Sodium	102	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21DR
	102	(80 - 120)	1.6	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21DT
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Vanadium	92	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21CD
	91	(80 - 120)	2.4	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21CE
		Dilution Factor: 1					
		Analysis Time..: 17:05					
Zinc	80	(80 - 120)			SW846 6010B	02/22-02/23/11	MEAF21CF
	80	(80 - 120)	2.5	(0-20)	SW846 6010B	02/22-02/23/11	MEAF21CG
		Dilution Factor: 1					
		Analysis Time..: 17:05					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

N Spiked analyte recovery is outside stated control limits.

G1B100574001
PDS-

TAL West Sac

SAMPLE SPIKE

Method: 6010 | Thermo6010 | Reported: 02/25/11 09:53:10

Department: 120 (Metals) | Source: MetEdit

Sample: MEAF0Z 5x | Spike Dilution: 5.00 | Sample Dilution: 5.00

Instrument: Thermo 6500 Duo | Channel 273
File: 022411 #22 | Method 6010T
Acquired: 02/24/2011 16:20:31 | Thermo6010 | Matrix: SOLID
Calibrated: 02/24/2011 16:28:02 | Units: ppm

CASN	Analyte Name	M/S	Area	Amount	Sample	%Rec.	Spike	Flag	Q
7440-22-4	Silver	328	0	0.04570	0.00003	91.4 457	0.0100		☑
7429-90-5	Aluminum	309	70	70.465	68.607	92.8 464	0.400	*	☑
7429-90-5	Aluminum	396	71	71.096	69.175	96 480	0.400	*	☑
7440-38-2	Arsenic	189	2	1.8753	0.04007	91.8 459	0.400		☑
7440-42-8	Boron	209	1	0.99921	0.04558	95.4 477	0.200		☑
7440-39-3	Barium	455	2	1.9115	0.08056	91.6 458	0.400		☑
7440-41-7	Beryllium	313	0	0.04704	0.00165	90.8 454	0.0100		☑
7440-70-2	Calcium	318	258	257.86	212.08	91.6 458	10.0	*	☑
7440-43-9	Cadmium	214	0	0.04520	0.00030	89.8 449	0.0100		☑
7440-43-9	Cadmium	229	0	0.04170	0.00030	82.8 414	0.0100		☑
7440-48-4	Cobalt	229	0	0.46845	0.01601	90.4 452	0.100		☑
7440-47-3	Chromium	268	0	0.31450	0.12890	92.8 464	0.0400		☑
7440-50-8	Copper	325	0	0.26043	0.03296	91.04 85	5.80 0.05		☑
7439-89-6	Iron	260	66	65.623	64.894	73.0 365	0.200	*	☐
7439-89-6	Iron	271	63	62.954	62.330	62.4 312	0.200	*	☐
7440-09-7	Potassium	766	59	59.061	10.806	96.6 483	10.0		☑
7439-95-4	Magnesium	279	61	61.468	16.538	89.8 449	10.0		☑
7439-96-5	Manganese	258	1	1.4799	1.0153	93.0 465	0.100		☑
7439-98-7	Molybdenum	202	1	0.90118	0.00154	90.0 450	0.200		☑
7440-23-5	Sodium	590	49	48.842	0.50875	96.6 483	10.0		☑
7440-02-0	Nickel	232	0	0.47888	0.03476	88.8 444	0.100		☑
7439-92-1	Lead	220	1	0.51160	0.06051	90.2 451	0.100		☑
7440-36-0	Antimony	207	0	0.47641	0.00149	95.0 475	0.100		☑
7782-49-2	Selenium	196	2	1.8161	0.00009	90.8 454	0.400		☑
7440-31-5	Tin	190	2	1.7826	0.00317	89.0 445	0.400		☑
7440-24-6	Strontium	408	1	1.1005	0.13090	97.0 485	0.200		☑
7440-32-6	Titanium	335	1	1.2590	0.35156	90.8 454	0.200		☑
7440-28-0	Thallium	191	2	1.7366	0.00203	86.8 434	0.400		☑
7440-62-2	Vanadium	292	1	0.58695	0.12412	92.6 463	0.100		☑
7440-21-3	Silicon	288	0	0.23068	0.24293	— 0.00	2.00		☐
7440-66-6	Zinc	206	1	0.50916	0.05981	89.8 449	0.100		☑
7723-14-0	Phosphorus	178	11	11.029	0.73697	103.0 515	2.00		☑
7704-34-9	Sulfur	182	11	10.995	1.1482	98.4 492	2.00		☑

> NQ - out due to abundance

CASN	ISTD Name	M/S	Area	Amount	Q
7440-65-5	Y	224	8725		☑
7440-65-5	Y	360	76124		☑
7440-65-5	Y	377	18734		☑

Reviewed by: Date:

IDB Reports | TestAmerica, Inc. | Version: 6.02.088

View Page 1 of 1

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[___]	___	✓
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.
NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "A" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[✓]	___	___

3 FD pairs see pages following -

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "+" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

30 per SAP

is any RPD ≥ ~~35%~~ but < 120%?	✓	[___]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ ~~35%~~ 30 but < 120%,

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SS01-0001-0211
Duplicate Sample ID: VEECA-4SS01P-0001-0201

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	36800	37100	1
arsenic	23.8	23.7	0
barium	43.4	44.2	2
beryllium	0.84	0.85	-0.01
cadmium	0.092	0.091	0.001
calcium	121000	124000	2
chromium	65.2	65.9	1
cobalt	8.1	8.3	2
copper	18.9	19.2	2
iron	37100	38300	3
lead	29.7	56.1	62
magnesium	8330	8300	0
manganese	581	587	1
nickel	17.5	17.7	1
potassium	6180	5910	4
selenium	2.6	2.7	4
sodium	282	293	4
thallium	0.27	0.26	4
vanadium	65.6	66.3	1
zinc	28.7	28.8	0

COMMENTS: Qualifications were required-J Pb in both samples.
Region II QC limits for flagging were used.

Sample ID: VEECA-1SB02-1H02-0211
Duplicate Sample ID: VEECA-1SB02P-1H02-0211

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	258	380	38
barium	4.3	6.1	-1.8
cadmium			0
calcium	218000	312000	35
chromium	4.7	6.9	38
cobalt			#DIV/0!
copper	0.45	0.66	-0.21
iron	483	696	36
magnesium	10200	13900	31
manganese	19.5	24.8	24
nickel	0.52	0.26	0.26
potassium			#DIV/0!
selenium			0
sodium	1490	2160	37
vanadium	2.6	3.6	32
zinc	0.36	0.57	-0.21

COMMENTS: Qualifications were required-J Al, Cr, Fe & Na in both samples.
Region II QC limits for flagging were used.

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-2SB09-4H6H-0211
Duplicate Sample ID: VEECA-2SB09P-4H6H-0211

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	12100	14200	16
arsenic			#DIV/0!
barium	133	44.7	99
beryllium			0
cadmium	0.23	0.26	-0.03
calcium	212000	218000	3
chromium	28.8	33.1	14
cobalt	8.4	9.2	9
copper	11	11.9	8
iron	20100	23000	13
lead			#DIV/0!
magnesium	5100	5440	6
manganese	550	562	2
nickel	9.1	9.6	5
potassium	564	679	19
selenium			#DIV/0!
sodium	2220	2510	12
thallium			#DIV/0!
vanadium	72	78.8	9
zinc	18.3	19.5	6

COMMENTS: Qualifications were required-J Ba in both samples.
Region II QC limits for flagging were used.

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL?	___	[✓]	___

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS)- Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Lab limits used

Is any LCS recovery:	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[___]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	✓	[___]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL. (NOTE:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

See next page for flags. Used >50X LOQ as cut off for flagging per DOD QSM 4.1 & SAP

ICP SERIAL DILUTIONS

Lab Name:	TestAmerica West Sacramento	**MS Lab Workorder:**	MEAF0P5
Lot Number:	G1B100574	**MS Lab Sample ID:**	G1B100574001
Matrix:	SOIL	**QC Batch ID:**	1053190
Instrument Id:	T01	**Analysis Date/Time:**	2/23/2011 4:45:01PM
Concentration Units:	UG/L	**Method:**	6010B

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M	
Aluminum	321351.0000		344129.9460		7.09		P	
Antimony	7.0800	U	0.5500	U			P	
Barium	379.4298		409.3500		7.89		P	
Beryllium	7.3000		7.7000	J	5.48		P	
Cadmium	0.8000	J	0.5000	U			P	
Chromium	570.0984		623.0000		9.28		P	
Cobalt	70.7798		80.1500		13.24		P	
Copper	165.1380		171.0000		3.55		P	
Lead	259.4268		305.0500		17.59	E	P	NQ
Magnesium	72808.6200		81160.0026		11.47	E	P	JW
Nickel	152.7654		174.1500		14.00	E	P	NQ
Silver	0.0000	U	-2.3500	U			P	
Sodium	2462.0760		2685.8497	J	9.09		P	
Vanadium	572.9442		617.2500		7.73		P	
Zinc	251.1138		284.4000		13.26	E	P	NQ

Please note - Pb, Ni & Zn results are < 50 X LOQ so criteria do not apply (per QSM 4.1)

G1B100574001

TAL West Sac

SERIAL DILUTION

Method: 6020 (SOP: SAC-MT-001) M02 Reported: 03/04/11 11:53:39

Department: 120 (Metals)

Source: MetEdit

Sample: **MEAF0P5** Serial Dilution: **5.00** Sample Dilution: **1.00**

Instrument: **ICPMS M02**
File: 110222B2 # 96
Acquired: 02/22/2011 19:51:05
Calibrated: 02/22/2011 19:13:17

Channel 262
Method 6020_
M02

Matrix: SOLID
Units: ug/L

CASN	Analyte Name	M/S	Area	Dilution	Sample	%Diff.	MDL	Flag	Q
7440-38-2	Arsenic	75	31017	249.25	228.04	10.3	1.5	E	☐
7782-49-2	Selenium	82	1015	22.880	13.383	71.0	1.0	NC	☑
7440-28-0	Thallium	205	2279	0.89352	2.4153	63.0	0.50	NC	☑

JTWJ in all

CASN	ISTD Name	M/S	Area	Amount	Q
7440-56-4	Germanium	72	673754		☐
7440-30-4	Thulium	169	432841		☐

* Analyte not requested for this batch, no MDL

NC : Serial dilution concentration < 100 X MDL

E : Difference greater than Limit (10%)

Reviewed by: Date:

IOB Reports TestAmerica, Inc. Version: 6.02.088

View Page 1 of 1

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: Designate "Field Blank" as such on Form I

		YES	NO	N/A
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

Dilutions were performed as required

		YES	NO	N/A
	0.1 amu for each isotope in the tuning solution?	[✓]		
	Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]		
	ACTION: If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".			
A.1.26	**ICP-MS Internal Standards - Form XV**			
A.1.26.1	Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]		
	Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]		
	ACTION: If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.			
A.1.26.2	Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 per SAP of the intensity of the same Internal Standard in the calibration blank?	[✓]		
	If no, was the original sample diluted ~~two~~ 5 fold, Internal Standard added and the sample re-analyzed?	[✓]		
	Was the %RI for the ~~two~~ 5 fold diluted sample within the acceptance limits (~~60-125%~~ 30-20)?	[✓]		
	ACTION: If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter			

diluted as necessary

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/8, 2/9
Received Date: 2/10, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/25 soils
Analysis Dates: 2/25 soils; 2/11 waters

All holding time requirements were met with the exception of the two rinse blanks that were submitted as part of this SDG. The reported results were qualified as the holding time of 24 hours was exceeded by app. 34 hours.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pairs of samples VEECA-4SS01-0001-0211 & VEECA-1SB01-1H02-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: VEECA-4SS01-0001-0211 Duplicate Sample ID: VEECA-4SS01P-0001-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium	0.067	0.067	0%

Comments: No qualifications were required.

Sample ID: VEECA-1SB02-1H02-0211 Duplicate Sample ID: VEECA-1SB02P-1H02-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No positive results were reported in these samples.

Sample ID: VEECA-2SB09-4H6H-0211 Duplicate Sample ID: VEECA-2SB09P-4H6H-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium	0.067	0.15	-0.08

Comments: No qualifications were required.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the samples in this SDG. Clarification of the calculations was requested from the laboratory. Some of the reported positive and non-detect results were flagged G by the laboratory to indicate observed matrix interferences. The laboratory appropriately raised the reporting limits. The G flags were crossed out and the results were reported at the elevated reporting limits without further qualification. No additional qualifications to the data were required.

Calc. clarification received 5/3/11. gjc 5311

Reviewer Jacqueline Cleveland **Date:** 4/28/11

Hexavalent Chromium Calcs - ICAL soils - 2/26/11

X - Response	Y - Concentration (mg/L)
0.001	0
0.005	0.005
0.009	0.01
0.022	0.025
0.042	0.05
0.082	0.1

slope, m (A1) =	1.232795153
y-int, (A0) =	-0.001413337
r =	0.999935359
Rr2=	0.999870723

VEECA-4SS01-0001-0211 Lab Value - 0.067J mg/Kg

Response = 0.003

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.002265049 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.04
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	5
% Solids Factor	0.857
Concentration =	0.066326739 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B110556, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B110556. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-2SB01-0103-0211	G1B110556-001	soil	X	X	X	X	X
VEECA-2SB02-0103-0211	G1B110556-002	soil	X	X	X	X	X
VEECA-2SB02P-0103-0211	G1B110556-003	soil	X	X	X	X	X
VEECA-2SB03-0001-0211	G1B110556-004	soil	X	X	X	X	X
VEECA-2SB04-0507-0211	G1B110556-005	soil	X	X	X	X	X
VEECA-2SB05-0507-0211	G1B110556-006	soil	X	X	X	X	X
VEECA-2SB06-0507-0211	G1B110556-007	soil	X	X	X	X	X
VEECA-EB01-021011-SB	G1B110556-008	water	X	X	X	X	X
VEECA-EB01-021011-SW	G1B110556-009	water	X	X	X	X	X
VEECA-2SB06-0507-0211 MS	G1B110556-007MS	soil	X	X	X	X	X
VEECA-2SB06-0507-0211 MSD	G1B110556-007MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB01-021011-SB and VEECA-EB01-021011-SW-equipment blanks; and sample VEECA-2SB02P-0103-0211-field duplicate sample of sample VEECA-2SB02-0103-0211.

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
- HPLC Performance *
- ICP MS Tuning *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- LLQ Standards *
- Blanks *
- Internal Standards *
- Surrogate Recoveries *
- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions *
- Field Duplicates *
- Field Triplicates NA
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

One sample reported positive results required qualification based on column quantitation %Ds greater than 40%.

Perchlorate

No qualifications to the data required.

Metals

The associated ICV standard exhibited a high recovery for sodium. The reported positive results for sodium in the samples were qualified as estimated J.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

Please note – some of the reported calcium result were flagged as RLA by the laboratory to indicate that the reporting limit were raised because of necessary dilutions. Also some results were flagged with a G to indicate that the reporting limit was raised based on observed matrix interference. These qualifiers were crossed out and no additional validation qualifiers were necessary due to these issues.

Hexavalent Chromium

Two rinse blanks exceeded the required 24-hour holding time. The reported results were qualified.

Please note - some results were flagged with a G to indicate that the reporting limit was raised based on observed matrix interference. These qualifiers were crossed out and no additional validation qualifiers were necessary due to this issue.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/9-10/11 and samples were received at the laboratory on 2/11/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Samples VEECA-EB01-021011-SB and VEECA-EB01-021011-SW exceeded the 24 hour holding time by approximately 30 hours. The reported results were qualified as estimated J/UJ with a qualifier code of HT.

Initial/Continuing Calibrations

Metals

The associated ICV analyzed 2/16/11 at 1425 exhibited a recovery for sodium that was above the upper QC limit of 110% at 115.1%. Therefore the reported positive results for sodium were qualified as estimated J in all samples, with a qualifier code of CCH.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS/MSD	Analytes	Samples	%R	Q Flag	Q Code
VEECA-2SB06-0507-0211	beryllium	all soil samples	79/79	J/UJ	MSL
	magnesium		70/77		
	silver		66/58		
	zinc		77/77		

Identification/Quantitation

Explosives

Qualifications were required in the samples due to high (>40%) column quantitation %Ds. Region II guidelines were followed in applying these qualifications. Sample results were flagged as noted in the following table below.

Sample ID	Compound	Column Quant %D	Qualifier	Q Code
VEECA-2SB03-0001-0211	tetryl	48	J	2C

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
VEECA-2SB03-0001-0211	tetryl	+	J	2C

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all samples	sodium	+	J	CCH
all soil samples	beryllium magnesium silver zinc	+/-	J/UJ	MSL

Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
VEECA-EB01-021011-SB, VEECA-EB01-021011-SW	hexavalent chromium	+	J	HT

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B110556

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021011-SB

HPLC

Lot-Sample #...: G1B110556-008 Work Order #...: MEC1G1A1 Matrix.....: WATER
Date Sampled...: 02/10/11 06:45 Date Received..: 02/11/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047200 Analysis Time..: 18:00
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.048 U	0.48	ug/L	0.024
1,3,5-Trinitrobenzene	0.048 U	0.096	ug/L	0.030
1,3-Dinitrobenzene	0.048 U	0.14	ug/L	0.048
2,4,6-Trinitrotoluene	0.048 U	0.14	ug/L	0.048
2,4-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2,6-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2-Amino-4,6-dinitrotoluene	0.096 U	0.29	ug/L	0.096
2-Nitrotoluene	0.096 U	0.96	ug/L	0.084
3-Nitrotoluene	0.096 U	0.48	ug/L	0.055
4-Amino-2,6-dinitrotoluene	0.048 U	0.14	ug/L	0.048
4-Nitrotoluene	0.096 U	0.96	ug/L	0.084
HMX	0.048 U	0.14	ug/L	0.035
Nitrobenzene	0.048 U	0.14	ug/L	0.048
Nitroglycerin	0.48 U	0.96	ug/L	0.32
PETN	0.48 U	0.96	ug/L	0.29
RDX	0.048 U	0.24	ug/L	0.035
Tetryl	0.048 U	0.14	ug/L	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(84 - 125)

VM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021011-SW

HPLC

Lot-Sample #...: G1B110556-009 Work Order #...: MEC2A1AC Matrix.....: WATER
Date Sampled...: 02/10/11 07:00 Date Received..: 02/11/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047200 Analysis Time..: 18:45
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.048 U	0.48	ug/L	0.024
1,3,5-Trinitrobenzene	0.048 U	0.096	ug/L	0.030
1,3-Dinitrobenzene	0.048 U	0.14	ug/L	0.048
2,4,6-Trinitrotoluene	0.048 U	0.14	ug/L	0.048
2,4-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2,6-Dinitrotoluene	0.048 U	0.14	ug/L	0.048
2-Amino-4,6-dinitrotoluene	0.096 U	0.29	ug/L	0.096
2-Nitrotoluene	0.096 U	0.96	ug/L	0.084
3-Nitrotoluene	0.096 U	0.48	ug/L	0.055
4-Amino-2,6-dinitrotoluene	0.048 U	0.14	ug/L	0.048
4-Nitrotoluene	0.096 U	0.96	ug/L	0.084
HMX	0.048 U	0.14	ug/L	0.035
Nitrobenzene	0.048 U	0.14	ug/L	0.048
Nitroglycerin	0.48 U	0.96	ug/L	0.32
PETN	0.48 U	0.96	ug/L	0.29
RDX	0.048 U	0.24	ug/L	0.035
Tetryl	0.048 U	0.14	ug/L	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(84 - 125)

WM 05/11/11

011

CH2M Hill Inc

Client Sample ID: VBECA-2SB01-0103-0211

HPLC

Lot-Sample #...: G1B110556-001 Work Order #...: MEC001AX Matrix.....: SOLID
Date Sampled...: 02/09/11 10:15 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/24/11
Prep Batch #...: 1053390 Analysis Time..: 23:15
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

VM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-2SB02-0103-0211

HPLC

Lot-Sample #...: G1B110556-002 Work Order #...: MEC031A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 09:15 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 00:00
Dilution Factor: 1
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-2SB02P-0103-0211

HPLC

Lot-Sample #...: G1B110556-003 Work Order #...: MEC051A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 09:15 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 00:45
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

MM 02/11/11

014

CH2M Hill Inc

Client Sample ID: VEECA-2SB03-0001-0211

HPLC

Lot-Sample #...: G1B110556-004 Work Order #...: MEC081A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 09:40 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 01:29
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	40 ~~J,PG~~ J,2C	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VKECA-2SB04-0507-0211

HPLC

Lot-Sample #...: G1B110556-005 Work Order #...: MEC1A1A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 12:40 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 02:15
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

MM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-2SB05-0507-0211

HPLC

Lot-Sample #...: G1B110556-006 Work Order #...: MEC1D1A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 14:40 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 03:00
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

017

CH2M Hill Inc

Client Sample ID: VEECA-2SB06-0507-0211

HPLC

Lot-Sample #...: G1B110556-007 Work Order #...: MEC1E1A4 Matrix.....: SOLID
Date Sampled...: 02/09/11 13:25 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 03:45
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

UM 05/11

018

CH2M Hill Inc

Client Sample ID: VERCA-2SB01-0103-0211

HPLC

Lot-Sample #...:	G1B110556-001	Work Order #...:	MEC001A0	Matrix.....:	SOLID
Date Sampled...:	02/09/11 10:15	Date Received..:	02/11/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054292	Analysis Time..:	06:40		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.7	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

VM 042111

UIS

CH2M Hill Inc

Client Sample ID: VRECA-2SB02-0103-0211

HPLC

Lot-Sample #...: G1B110556-002 Work Order #...: MEC031AA Matrix.....: SOLID
Date Sampled...: 02/09/11 09:15 Date Received..: 02/11/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 06:57
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.43 U	5.3	ug/kg	0.28

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

026

CH2M Hill Inc

Client Sample ID: VEECA-2SB02P-0103-0211

HPLC

Lot-Sample #...: G1B110556-003 Work Order #...: MEC051AA Matrix.....: SOLID
Date Sampled...: 02/09/11 09:15 Date Received..: 02/11/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 07:50
Dilution Factor: 0.99
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.42 U	5.3	ug/kg	0.27

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

LM 042111

CH2M Hill Inc

Client Sample ID: VKECA-2SB03-0001-0211

HPLC

Lot-Sample #...:	G1B110556-004	Work Order #...:	MEC081AA	Matrix.....:	SOLID
Date Sampled...:	02/09/11 09:40	Date Received..:	02/11/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054292	Analysis Time..:	08:08		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.33 J	5.7	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

WM 042111

022

CH2M Hill Inc

Client Sample ID: VEECA-2SB04-0507-0211

HPLC

Lot-Sample #...: G1B110556-005 Work Order #...: MEC1A1AA Matrix.....: SOLID
Date Sampled...: 02/09/11 12:40 Date Received..: 02/11/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 08:25
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.45 U	5.6	ug/kg	0.29

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

UM 042111

025

CH2M Hill Inc

Client Sample ID: VEECA-2SB05-0507-0211

HPLC

Lot-Sample #...: G1B110556-006 Work Order #...: MEC1D1AA Matrix.....: SOLID
Date Sampled...: 02/09/11 14:40 Date Received..: 02/11/11
Prep Date.....: 02/23/11 Analysis Date..: 02/26/11
Prep Batch #...: 1054292 Analysis Time..: 08:43
Dilution Factor: 1.01
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.44 U	5.6	ug/kg	0.29

NOTE(S):
Results and reporting limits have been adjusted for dry weight.

MM 042111

024

CH2M Hill Inc

Client Sample ID: VERCA-2SB06-0507-0211

HPLC

Lot-Sample #...:	G1B110556-007	Work Order #...:	MEC1E1AA	Matrix.....:	SOLID
Date Sampled...:	02/09/11 13:25	Date Received..:	02/11/11		
Prep Date.....:	02/23/11	Analysis Date..:	02/26/11		
Prep Batch #...:	1054292	Analysis Time..:	09:00		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.43 U	5.4	ug/kg	0.28

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

025

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021011-SB

Dissolved HPLC

Lot-Sample #...: G1B110556-008 Work Order #...: MEC1G2A0 Matrix.....: WATER
Date Sampled...: 02/10/11 06:45 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/23/11
Prep Batch #...: 1053108 Analysis Time..: 01:36
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042111

026

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021011-SW

Dissolved HPLC

Lot-Sample #...: G1B110556-009 Work Order #...: MEC2A2AA Matrix.....: WATER
Date Sampled...: 02/10/11 07:00 Date Received..: 02/11/11
Prep Date.....: 02/22/11 Analysis Date..: 02/23/11
Prep Batch #...: 1053108 Analysis Time..: 01:54
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

UM 042111

027

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB01-0103-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC00
Matrix:	SOIL	**Lab Sample ID:**	G1B110556001
% Solids:	87.0	**Date/Time Collected:**	02/09/11 10:15
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	979.0000			P
7440-36-0	Antimony	2.3000	U		P
7440-38-2	Arsenic	1.0000	~~B~~		P
7440-39-3	Barium	7.8000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	332000.00	~~RLA~~		P
7440-47-3	Chromium	6.6000	~~B~~		P
7440-48-4	Cobalt	0.3200	J		P
7440-50-8	Copper	1.9000			P
7439-89-6	Iron	1130.0000			P
7439-92-1	Lead	0.5700	U		P
7439-95-4	Magnesium	9920.0000		J MSL	P
7439-96-5	Manganese	48.6000			P
7440-02-0	Nickel	0.6200	J		P
7440-09-7	Potassium	211.0000			P
7782-49-2	Selenium	0.5400			P
7440-22-4	Silver	0.2300	~~U~~	UJ MSL	P
7440-23-5	Sodium	2280.0000		J CCH	P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	3.5000			P
7440-66-6	Zinc	2.0000	~~+~~	J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.
Results and reporting limits have been adjusted for dry weight

JAC 4/27/11

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VBECA-2SB02-0103-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC03
Matrix:	SOIL	**Lab Sample ID:**	G1B110556002
% Solids:	94.0	**Date/Time Collected:**	02/09/11 9:15
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	5860.0000			P
7440-36-0	Antimony	2.1000	U		P
7440-38-2	Arsenic	13.8000			P
7440-39-3	Barium	11.6000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	329000.00	~~RLA~~		P
7440-47-3	Chromium	12.8000	~~B~~		P
7440-48-4	Cobalt	2.1000			P
7440-50-8	Copper	7.7000			P
7439-89-6	Iron	8130.0000			P
7439-92-1	Lead	0.3100	J		P
7439-95-4	Magnesium	3130.0000		J MSL	P
7439-96-5	Manganese	276.0000			P
7440-02-0	Nickel	3.8000			P
7440-09-7	Potassium	1020.0000			P
7782-49-2	Selenium	0.5000			P
7440-22-4	Silver	0.2100	~~U~~	UJ MSL	P
7440-23-5	Sodium	179.0000		J CCH	P
7440-28-0	Thallium	0.0630	~~B~~		P
7440-62-2	Vanadium	26.7000			P
7440-66-6	Zinc	10.2000		J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/27/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB02P-0103-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC05
Matrix:	SOIL	**Lab Sample ID:**	G1B110556003
% Solids:	94.2	**Date/Time Collected:**	02/09/11 9:15
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	5060.0000			P
7440-36-0	Antimony	2.1000	U		P
7440-38-2	Arsenic	14.3000			P
7440-39-3	Barium	11.4000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	333000.00	~~RLA~~		P
7440-47-3	Chromium	11.4000	~~B~~		P
7440-48-4	Cobalt	2.1000			P
7440-50-8	Copper	7.0000			P
7439-89-6	Iron	7330.0000			P
7439-92-1	Lead	0.5300	U		P
7439-95-4	Magnesium	2840.0000		J MSL	P
7439-96-5	Manganese	319.0000			P
7440-02-0	Nickel	3.6000			P
7440-09-7	Potassium	884.0000			P
7782-49-2	Selenium	0.5700			P
7440-22-4	Silver	0.2100	~~U~~	UJ MSL	P
7440-23-5	Sodium	162.0000		J CCH	P
7440-28-0	Thallium	0.0630	~~B~~		P
7440-62-2	Vanadium	25.6000			P
7440-66-6	Zinc	9.5000		J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JMC 4/27/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB03-0001-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC08
Matrix:	SOIL	**Lab Sample ID:**	G1B110556004
% Solids:	86.0	**Date/Time Collected:**	02/09/11 9:40
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15400.000			P
7440-36-0	Antimony	2.3000	U		P
7440-38-2	Arsenic	21.7000			P
7440-39-3	Barium	28.5000			P
7440-41-7	Beryllium	0.2000	~~J~~	J MSL	P
7440-43-9	Cadmium	0.0600	J		P
7440-70-2	Calcium	169000.00	~~RLA~~		P
7440-47-3	Chromium	29.0000	~~B~~		P
7440-48-4	Cobalt	5.9000			P
7440-50-8	Copper	19.3000			P
7439-89-6	Iron	17300.000			P
7439-92-1	Lead	1.3000			P
7439-95-4	Magnesium	6880.0000		J MSL	P
7439-96-5	Manganese	479.0000			P
7440-02-0	Nickel	10.1000			P
7440-09-7	Potassium	3760.0000			P
7782-49-2	Selenium	1.1000			P
7440-22-4	Silver	0.2300	~~J~~	UJ MSL	P
7440-23-5	Sodium	381.0000		J CCH	P
7440-28-0	Thallium	0.1000	~~B~~		P
7440-62-2	Vanadium	34.9000			P
7440-66-6	Zinc	25.0000		J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JLC 4/27/11

U31

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB04-0507-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC1A
Matrix:	SOIL	**Lab Sample ID:**	G1B110556005
% Solids:	89.0	**Date/Time Collected:**	02/09/11 12:40
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	656.0000			P
7440-36-0	Antimony	2.2000	U		P
7440-38-2	Arsenic	0.3400	U		P
7440-39-3	Barium	6.8000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	354000.00	~~RLA~~		P
7440-47-3	Chromium	7.0000	~~B~~		P
7440-48-4	Cobalt	0.5600	U		P
7440-50-8	Copper	0.9300	J		P
7439-89-6	Iron	1240.0000			P
7439-92-1	Lead	0.5600	U		P
7439-95-4	Magnesium	12700.000		J MSL	P
7439-96-5	Manganese	42.3000			P
7440-02-0	Nickel	0.4600	J		P
7440-09-7	Potassium	154.0000			P
7782-49-2	Selenium	0.4100			P
7440-22-4	Silver	0.2200	~~U~~	UJ MSL	P
7440-23-5	Sodium	2090.0000		J CCH	P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	4.6000			P
7440-66-6	Zinc	1.4000	~~J~~	J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JBC 42711

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB05-0507-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC1D
Matrix:	SOIL	**Lab Sample ID:**	G1B110556006
% Solids:	90.9	**Date/Time Collected:**	02/09/11 14:40
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	919.0000			P
7440-36-0	Antimony	2.2000	U		P
7440-38-2	Arsenic	0.6300			P
7440-39-3	Barium	7.9000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	356000.00	~~RLA~~		P
7440-47-3	Chromium	6.8000	~~B~~		P
7440-48-4	Cobalt	0.4300	J		P
7440-50-8	Copper	1.7000			P
7439-89-6	Iron	2020.0000			P
7439-92-1	Lead	0.5500	U		P
7439-95-4	Magnesium	11500.000		J MSL	P
7439-96-5	Manganese	54.6000			P
7440-02-0	Nickel	0.6800	J		P
7440-09-7	Potassium	192.0000			P
7782-49-2	Selenium	1.9000			P
7440-22-4	Silver	0.2200	~~U~~	UJ MSL	P
7440-23-5	Sodium	2310.0000		J CCH	P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	6.5000			P
7440-66-6	Zinc	2.5000		J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 4/27/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB06-0507-0211
Lot Number:	G1B110556	**Lab WorkOrder:**	MEC1E
Matrix:	SOIL	**Lab Sample ID:**	G1B110556007
% Solids:	92.0	**Date/Time Collected:**	02/09/11 13:25
Units:	MG/KG	**Date/Time Received:**	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	761.0000			P
7440-36-0	Antimony	2.2000	U		P
7440-38-2	Arsenic	0.4700	~~B~~		P
7440-39-3	Barium	7.2000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	350000.00	~~RLA~~		P
7440-47-3	Chromium	6.5000	~~B~~		P
7440-48-4	Cobalt	0.5400	U		P
7440-50-8	Copper	1.1000	J		P
7439-89-6	Iron	1260.0000			P
7439-92-1	Lead	0.5400	U		P
7439-95-4	Magnesium	11900.000		J MSL	P
7439-96-5	Manganese	45.6000			P
7440-02-0	Nickel	0.4700	J		P
7440-09-7	Potassium	175.0000			P
7782-49-2	Selenium	0.3600			P
7440-22-4	Silver	0.2200	~~U~~	UJ MSL	P
7440-23-5	Sodium	1940.0000		J CCH	P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	4.5000			P
7440-66-6	Zinc	1.7000	~~J~~	J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 42711

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-EB01-021011-SB
Lot Number:	G1B110556	Lab WorkOrder:	MEC1G
Matrix:	WATER	Lab Sample ID:	G1B110556008
% Solids:	0.0	Date/Time Collected:	02/10/11 6:45
Units:	UG/L	Date/Time Received:	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	129.0000	J		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.

JC 4/2/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-EB01-021011-SW
Lot Number:	G1B110556	Lab WorkOrder:	MEC2A
Matrix:	WATER	Lab Sample ID:	G1B110556009
% Solids:	0.0	Date/Time Collected:	02/10/11 7:00
Units:	UG/L	Date/Time Received:	02/11/11 9:40

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

JMC 4-27-11

036

CH2M Hill Inc

Client Sample ID: VEECA-2SB01-0103-0211

General Chemistry

Lot-Sample #...: G1B110556-001 Work Order #...: MEC00 Matrix.....: SOLID
Date Sampled...: 02/09/11 10:15 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.029 U	0.057	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 1			Analysis Time..: 17:34	DL.....: 0.011	
Percent Moisture	13.0	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:55	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 42711

037

CH2M Hill Inc

Client Sample ID: VEECA-2SB02-0103-0211

General Chemistry

Lot-Sample #...: G1B110556-002 **Work Order #...:** MEC03 **Matrix.....:** SOLID
Date Sampled...: 02/09/11 09:15 **Date Received..:** 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.13 U G	0.27	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 5			Analysis Time..: 17:34	DL.....: 0.053	
Percent Moisture	6.0	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:55	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/27/11

038

CH2M Hill Inc

Client Sample ID: VERCA-2SB02P-0103-0211

General Chemistry

Lot-Sample #...: G1B110556-003 Work Order #...: MEC05 Matrix.....: SOLID
Date Sampled...: 02/09/11 09:15 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.13 ~~U~~ G	0.27	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 5			Analysis Time..: 17:35	DL.....: 0.053	
Percent Moisture	5.8	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:55	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 02/11

035

CH2M Hill Inc

Client Sample ID: VEECA-2SB03-0001-0211

General Chemistry

Lot-Sample #...: G1B110556-004 Work Order #...: MEC08 Matrix.....: SOLID
Date Sampled...: 02/09/11 09:40 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.14 U G	0.29	mg/kg	SW846 7196A	02/25/11	1055328
		Dilution Factor: 5		Analysis Time..: 17:36	DL.....: 0.058	
Percent Moisture	13.6	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:55	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 4/27/11

646

CH2M Hill Inc

Client Sample ID: VEECA-2SB04-0507-0211

General Chemistry

Lot-Sample #...: G1B110556-005 Work Order #...: MEC1A Matrix.....: SOLID
Date Sampled...: 02/09/11 12:40 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.028 U	0.056	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 1			Analysis Time..: 17:36	DL.....: 0.011	
Percent Moisture	10.6	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:55	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JC 42711

041

CH2M Hill Inc

Client Sample ID: VEECA-2SB05-0507-0211

General Chemistry

Lot-Sample #...: G1B110556-006 Work Order #...: MEC1D Matrix.....: SOLID
Date Sampled...: 02/09/11 14:40 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.027 U	0.055	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 1			Analysis Time..: 17:37	DL.....: 0.011	
Percent Moisture	9.1	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JBC 42711

042

CH2M Hill Inc

Client Sample ID: VEECA-2SB06-0507-0211

General Chemistry

Lot-Sample #...: G1B110556-007 Work Order #...: MEC1E Matrix.....: SOLID
Date Sampled...: 02/09/11 13:25 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.027 U	0.054	mg/kg	SW846 7196A	02/25/11	1055328
	Dilution Factor: 1			Analysis Time..: 17:38	DL.....: 0.011	
Percent Moisture	8.0	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JLC 42711

045

CH2M Hill Inc

Client Sample ID: VKECA-EB01-021011-SB

General Chemistry

Lot-Sample #...: G1B110556-008 Work Order #...: MEC1G Matrix.....: WATER
Date Sampled...: 02/10/11 06:45 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 J UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:28 DL.....: 2.0

JAC 42711

044

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021011-SW

General Chemistry

Lot-Sample #...: G1B110556-009 Work Order #...: MEC2A Matrix.....: WATER
Date Sampled...: 02/10/11 07:00 Date Received..: 02/11/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/11/11	1043052

Dilution Factor: 1 Analysis Time..: 16:28 DL.....: 2.0

JJC 42711

045

Case Narrative

TestAmerica West Sacramento Project Number G1B110556

General Comments

The recommended 24 hour holding time was exceeded for hexavalent chromium for samples VEECA-EB01-021011-SB AND VEECA-EB01-021011-SW. Samples were received after the holding time was past.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

WATER, 8330B, Nitroaromatics & Nitramines
Samples: 8, 9
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 1, 2, 3, 4, 5, 6, 7
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MEQ8T1AC
SMCS: MEQ8T1AD

WATER, 6850/DOD Handbook, Perchlorate
Samples: 8, 9
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

WATER, 6010B, Total Metals
Samples: 8, 9
The recoveries for the analytes Aluminum, Iron and Sodium are outside the established control limits for the MS/MSD associated with this batch. Acceptable LCS data demonstrate that the analytical system is in control.

046

Case Narrative

TestAmerica West Sacramento Project Number G1B110556

SOILD, 6010B, Total Metals
Samples: 1, 2, 3, 4, 5, 6, 7
The recoveries for the analytes Aluminum, Beryllium, Calcium, Iron, Magnesium, Silver and Zinc are outside the established control limits for the MS/MSD associated with this batch. The concentrations of Calcium and Iron in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

The method blank associated with this extraction batch has Chromium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

WATER, 7196A, Hexavalent Chromium
Samples: 8, 9
The noted samples were received in the laboratory after the holding time for the test had expired. The samples were analyzed after consultation with the client.

There are no other anomalies associated with this project.

047

Sample Summary

TestAmerica West Sacramento Project Number G1B110556

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEC00	1	VEECA-2SB01-0103-0211	2/9/2011 10:15 AM	2/11/2011 09:40 AM
MEC03	2	VEECA-2SB02-0103-0211	2/9/2011 09:15 AM	2/11/2011 09:40 AM
MEC05	3	VEECA-2SB02P-0103-0211	2/9/2011 09:15 AM	2/11/2011 09:40 AM
MEC08	4	VEECA-2SB03-0001-0211	2/9/2011 09:40 AM	2/11/2011 09:40 AM
MEC1A	5	VEECA-2SB04-0507-0211	2/9/2011 12:40 PM	2/11/2011 09:40 AM
MEC1D	6	VEECA-2SB05-0507-0211	2/9/2011 02:40 PM	2/11/2011 09:40 AM
MEC1E	7	VEECA-2SB06-0507-0211	2/9/2011 01:25 PM	2/11/2011 09:40 AM
MEC1G	8	VEECA-EB01-021011-SB	2/10/2011 06:45 AM	2/11/2011 09:40 AM
MEC2A	9	VEECA-EB01-021011-SW	2/10/2011 07:00 AM	2/11/2011 09:40 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

U48

G1B110556

G1B110556

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj Name/No.: ECA-RI
Airbill number: 8747 2112 6677

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container(s) / Preservatives

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for sediments	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
	Container				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	
	Test America Supplied Label				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8650 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	
	Preservative				4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	
1	VEECA-2SB01-0103-0211	02-09-11 1015	sb	1				1													
2	VEECA-2SB02-0103-0211	02-09-11 0915	sb	1				1													
3	VEECA-2SB02P-0103-0211	02-09-11 0915	sb	1				1													
4	VEECA-2SB03-0001-0211	02-09-11 0940	sb	1				1													
5	VEECA-2SB04-0507-0211	02-09-11 1240	sb	1				1													
6	VEECA-2SB05-0507-0211	02-09-11 1440	sb	1				1													
7	VEECA-2SB06-0507-0211	02-09-11 1325	sb	1				1													
7MS	VEECA-2SB06-0507-0211-MS	02-09-11 1325	sb	1				1													
7MSD	VEECA-2SB06-0507-0211-SD	02-09-11 1325	sb	1				1													
8	VEECA-EB01-021011-SB	02-10-11 0645	AQ	5									2	1	1	1					

DAW 02/10/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
DWhitaker	02/10/11 1200	FedEx				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
		Chang Vue 02/11/11 -1150				

G1B110556

G1B110556 № 02395

CHAIN OF CUSTODY

Page 1 of 1

CompuChem
a division of Liberty Analytical Corp.

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

Courier:
Airbill No.:
Sampling Complete? Y or N

Company Name: CH2M Hill	Project Name: ECA Sampling
Address: 5700 Cleveland St, Suite 101	Sampling Location: Vieques, PR
City: Virginia Beach State: VA Zip: 23462	Turnaround time:
Project Contact: Vicky Weber	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: 757-671-6200	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: J. Martin	Are high concentrations expected? Y or N If yes, which ID(s)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other Mine	EXPID 8330 B	PERCH 6850	Metal Hg 7196A	Metals 6010B/6020
9	VEECA-EB01-021011-SW	2/10	700	AQ	5			1			4	✓	✓	✓	✓

Sample Unpacked By:
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

Relinquished by:	Date/Time: 2/10/11 1700	Received by: Cheng Une	Date/Time: 02/11/11 - 1150
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: °C

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

White & Yellow copy to lab • Pink copy for customer

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CAM Hill PM _____ LOG # 69328

LOT# (QUANTIMS ID) 51B110556 QUOTE# 88113 LOCATION W3B

Checked (✓)

DATE RECEIVED 02/11/11 TIME RECEIVED 0940 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) See multi cooler checklist ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☑

LV 02/11/11

Initials Date

---

pH MEASURED ☑ YES ☐ ANOMALY ☐ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

CU 02/11/11

Initials Date

Notes HTU

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B110556

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB								2	2											
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ	1	1	1	1	1	1	3													
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn								1	1											
500PJna																				
500PJzn/na																				
250PJ								2	2											
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-165 5/05 EM

Page 3

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): G1B110556

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600157, 600158 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 2 CORRECTED 2 ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 1 2 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑ 00 02/11/11

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☑ N/A ☑

CUSTODY SEAL #(S) NA ☑

COC #(S) 62395

TEMPERATURE BLANK: OBSERVED: NA CORRECTED ☑

SAMPLE TEMPERATURE:

OBSERVED: 2 4 3 AVERAGE: 3 CORRECTED 3 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☑ 00 02/11/11

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S) 00 02/11/11

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

Initials Date

G1B110556

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B110556

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AGBs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X									✓	✓											
500PJna	500PJzn/na	250PJna	250PJzn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

TestAmerica West Sacramento (916) 373 - 5600

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B110556

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ [✓]

Are the chromatograms free of interferences? [ ] ___ [✓]

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/9-10/11 Prep 2/16-22/11

8.0 Holding Times Rec'd 2/11/11 Analy 2/24-25/11

8.1 Have any nitroaromatics and nitroamines technical

Temp 1-4°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ 14 ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] [ ] [ ]

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] [ ] [ ]

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] [ ] [ ]

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-021011-SB NO

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ✓ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro RP-C18

column 2: Synergi Hydro RP-C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ✓ ___ ___

b. All blanks ✓ ___ ___

c. Matrix spike samples ✓ ___ ___

d. 5 pt. initial calibration standards ✓ ___ ___

e. Calibration verification standards ✓ ___ ___

f. Laboratory Control samples (LCS) ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ✓ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

067

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] [✓] ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

w/in 1 min

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

065

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? see below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data validator checked CCal in sequence and compared RT to check stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines)

run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

071

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

W/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ✓ ___

Checked by Data-Validator

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ ✓ ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? ✓ ___ ___

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ ✓ ___

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ✓ ___

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B110556 4
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 2/25/2011 Analysis Date (2): 2/26/2011

CMPNAM	Result(Col1)	Result(Col2)	%D	Q
1,3,5-Trinitrobenzene	ND	NA	NA	
1,3-Dinitrobenzene	ND	NA	NA	
2,4,6-Trinitrotoluene	ND	NA	NA	
2,4-Dinitrotoluene	ND	NA	NA	
2,6-Dinitrotoluene	ND	NA	NA	
2-Amino-4,6-dinitrotoluene	ND	NA	NA	
3,5-Dinitroaniline	ND	NA	NA	
4-Amino-2,6-dinitrotoluene	ND	NA	NA	
RDX	ND	NA	NA	
TETRYL	40.39	24.83	48%	PG
m-Nitrotoluene	ND	NA	NA	
Nitrobenzene	ND	NA	NA	
Nitroglycerin	ND	NA	NA	
HMX	ND	NA	NA	
o-Nitrotoluene	ND	NA	NA	
PETN	ND	NA	NA	
p-Nitrotoluene	ND	NA	NA	

J

13.45
CCal 13.35
13.34

46.78
CCal 44.87
46.88

Sample Summary

TestAmerica West Sacramento Project Number G1B110556

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEC00	1	VEECA-2SB01-0103-0211	2/9/2011 10:15 AM	2/11/2011 09:40 AM
MEC03	2	VEECA-2SB02-0103-0211	2/9/2011 09:15 AM	2/11/2011 09:40 AM
MEC05	3	VEECA-2SB02P-0103-0211	2/9/2011 09:15 AM	2/11/2011 09:40 AM
MEC08	4	VEECA-2SB03-0001-0211	2/9/2011 09:40 AM	2/11/2011 09:40 AM
MEC1A	5	VEECA-2SB04-0507-0211	2/9/2011 12:40 PM	2/11/2011 09:40 AM
MEC1D	6	VEECA-2SB05-0507-0211	2/9/2011 02:40 PM	2/11/2011 09:40 AM
MEC1E	7	VEECA-2SB06-0507-0211	2/9/2011 01:25 PM	2/11/2011 09:40 AM
MEC1G	8	VEECA-EB01-021011-SB	2/10/2011 06:45 AM	2/11/2011 09:40 AM
MEC2A	9	VEECA-EB01-021011-SW	2/10/2011 07:00 AM	2/11/2011 09:40 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ N ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? N ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? ✓ ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ ✓ ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. ✓ ___ ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

VEECA-2SB02-0103-0211
VEECA-2B02P-0103-0211 > No ⊕

Field Triplicate —
not submitted for this data pkg

Initial Calibration Date: 1/9/2011

RRF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 48.9000

Height of Compound	2445
Conc. of Compound	50
Calculated RF	48.900

Compound Name: nitrobenzene
Lab Value: 9.1

RF of STD 1	79.20
RF of STD 2	78.60
RF of STD 3	73.50
RF of STD 4	73.10
RF of STD 5	70.20
RF of STD 6	72.35
RF of STD 7	66.88
RF of STD 8	59.02
Calculated % RSD	9.1

Continuing Calibration File ID: 2/24/11, 20:15

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	10193
Conc. of Compound	100
Calculated RF	101.930

Compound Name: tertyl
Lab Value: 10

Average RF	92.905
RF of CCV	101.930
Calculated % D	-10

SAMPLE CALCULATION

Sample ID: VEECA-2SB03-0001-0211
Standard ID: ICAL 01/09/11
Compound: tertyl
Concentration: 40 ug/Kg

	Water (ug/L)	Soil (ug/Kg)
Height of Compound		477
RF of Compound		92.90488
Final Volume		80
Dilution Factor		1
Split Factor		1
Injection Volume		1
Weight of Sample	na	10.17
Initial Volume of Sample		NA
Conversion Factor		1
Percent Solids Factor		1
Concentration	#DIV/0!	40.39

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 5:47 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI
Attachments: 8330 Form X.PDF; 8330 Form X.XLS; Cross Reference Summaries.pdf

Hi Laura,
Attached are The other forms you requested. We're providing both an excel summary and pdfs of the summary. I wasn't sure which would be easier for you to use. I've also provided a cross-reference summary as we're only showing the lab IDs on the forms. Please let me know if you need anything else.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365718-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (sum)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MS 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/9-10/11
Received Date: 2/11/11
Prep Date: 2/22-23/11
Analysis Dates: 2/23-26/11
Cooler Temp: 1-4°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

All method and/or grinding blanks exhibited no contamination-no qualifications required. Associated QC blanks were: VEECA-EB01-021011-SB (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-2SB06-0507-0211-all criteria met.

Field Duplicate Sample

A field duplicate was submitted for VEECA-2SB02-0103-0211-no positive results were exhibited, no qualifications.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer Laura Marcelino **Date:** 4/21/11

GIB110556

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]		
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]		

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]		
Is Sample Log-In Sheet(Form DC-1) present and complete?	[ ]		✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[ ]		✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]		
Laboratory Code?	[ ]	✓	✓
RAS/Non-RAS Case No.?	[ ]	✓	✓
SDG No.?	[✓]		

	YES	NO	N/A
Contract No.?	[ ]	✓	

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments? (values - not validated)	✓		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?		✓	
Mercury analysis(28 days) exceeded?		✓	
Other Metals analysis(180 days)exceeded?		✓	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	✓		
Cyanide Analysis ≥ 12?			✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	✓		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B110556

2/16, 1747

ICP - AES	
SAMPLE ID	VEECA-2SB01-0103-0211
ANALYTE	aluminum
Lab Value CONCENTRATION (mg/Kg)	979
AMOUNT FROM RAW DATA (ug/ml)	8.6851
SAMPLE SIZE (g)	1.02
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.87
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	978.713

2/17, 1104

ICP-MS	
SAMPLE ID	VEECA-2SB03-0001-0211
ANALYTE	thallium
Lab Value CONCENTRATION (mg/Kg)	0.10J
AMOUNT FROM RAW DATA (ug/L)	0.884086
SAMPLE SIZE (g)	0.98
FINAL VOLUME (L)	0.1
DILUTION FACTOR	0.87
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	0.07849

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]		✓

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES (more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ". **NOTE**: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

		YES	NO	N/A
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).			
A.1.12.2	Circle on each Form IIA all percent recoveries that are outside the contract windows.			
	Are ICV/CCVs within control limits for:			
	Metals - 90-110%R?	[___]	✓	___
	Hg - 80-120%R?	[___]	___	✓
	Cyanide - 85-115%R?	[___]	___	✓
	ACTION: If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:			
	Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).			
	NOTE: For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.			
A.1.12.3	Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)?	[___]	___	✓
	ACTION: If no, Qualify all cyanide results ≥ MDL as "J".			

See pages following for possible flags

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

Initial and Continuing Calibration Verification

		02/16/11 14:25 ICV4 Found %REC	02/16/11 14:28 ICV2A Found %REC
Manganese	1000	1030.1 103.0	
Nickel	0		
	1000	1019.3 101.9	
Potassium	0		82.37 0.0
	10000	9881.9 98.8	
Silver	0		
	250	244.65 97.9	
Sodium	10000	11505 115.1	
	25000		25187 100.7
Vanadium	0		
	1000	978.62 97.9	
Zinc	0		1.77 0.0
	1000	997.90 99.8	

J+ all samples associated

CH2M Hill Inc

Initial and Continuing Calibration Verification

		02/18/11 10:07 ICV4 Found %REC	02/18/11 10:09 ICV2A Found %REC
Manganese	0		
	1000	1036.3 103.6	
Nickel	0		
	1000	1012.9 101.3	
Potassium	0		64.20 0.0
	10000	9888.4 98.9	
Silver	0		
	250	245.62 98.2	
Sodium	10000	11692 116.9	
	25000		25573 102.3
Vanadium	0		
	1000	975.68 97.6	
Zinc	0		1.46 0.0
	1000	989.21 98.9	

NQ - Na not reported from these runs

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B110556 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110224A1

Analyte	True Conc.	02/25/11 00:19 CCV 13 Found	%REC	02/25/11 00:28 CCV 14 Found	%REC	02/25/11 01:07 CCV 15 Found	%REC
Arsenic	100	100.05	100.0	99.54	99.5	98.99	99.0
Selenium	100	99.03	99.0	98.19	98.2	100.06	100.1
Thallium	50	48.76	97.5	50.55	101.1	49.77	99.5

Lot Number: G1B110556 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110224A1

Analyte	True Conc.	02/25/11 01:15 CCV 16 Found	%REC	02/25/11 01:22 CCV 17 Found	%REC	02/25/11 02:02 CCV 18 Found	%REC
Arsenic	100	110.59	110.6	98.82	98.8	99.84	99.8
Selenium	100	122.89	122.9	100.00	100.0	100.24	100.2
Thallium	50	50.68	101.4	50.08	100.2	49.03	98.1

no samples assoc - no goals

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab method/SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B170553_LLQS.pdf; G1B170426_LLQS.pdf; G1B120440_LLQS.pdf; G1B120421_LLQS.pdf; G1B110556_LLQS.pdf

Hi Jackie,
Attached are the next 5 files of data for this project.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

unassoc. std.

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[ ]	[✓]	
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?		[✓]	
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?		[✓]	
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?		[✓]	
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run ,

A.1.15 **Preparation Blank - FORM III**

NOTE:The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[___]	___	___
Each matrix type?	[___]	___	___
All instruments used for metals and cyanide analyses?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

$\geq$ MDL but $\leq$ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value $\geq$ MDL but $\leq$ CRQL? ✓ ___ [___] ___

see next page for notes on any goals needed.

ACTION:
If yes, change sample result $\geq$ MDL

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1B150000290B
Lot Number:	G1B110556	**Lab WorkOrder:**	MEF6A
Matrix:	SOIL	**Lab Sample ID:**	G1B150000290B
Instrument Id:	T01	**Analysis Date/Time:**	2/18/2011 10:58:00AM
Units:	MG/KG		

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	25.0000	U	P
Chromium	0.1500	J	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	5.0000	U	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	25.0000	U	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

NQ all + results > action limit of LOD

U Result is less than the reporting limit. (RL)
J Estimated Result. Result is less than RL.

associated with all soils

Form 3 Prep Blank Equivalent

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every ~~20~~ analytical samples? @ beginning only	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:**

For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%)flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	___
	ACTION: If the matrix spike recovery is less than 30%,reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B110556	**MS Lab Workorder:**	MEAFW - MS
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006S
% Solids	0.0	**QC Batch ID:**	1045234
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	4680.0000	N	2010.0000		2000.0000	133.0	N	P	NQ
Antimony	80 - 120	530.0000		200.0000		500.0000	104.0		P	
Barium	80 - 120	2110.0000		68.8000	J	2000.0000	102.0		P	
Beryllium	80 - 120	49.7000		10.0000		50.0000	99.0		P	
Cadmium	80 - 120	50.0000		10.0000		50.0000	100.0		P	
Calcium	80 - 120	661000.0000		604000.0000		50000.0000	114.0		P	
Cobalt	80 - 120	513.0000		50.0000		500.0000	102.0		P	
Copper	80 - 120	270.0000		50.0000		250.0000	104.0		P	
Iron	80 - 120	3270.0000	N	2040.0000		1000.0000	123.0	N	P	NQ
Lead	80 - 120	500.0000		50.0000		500.0000	100.0		P	
Magnesium	80 - 120	754000.0000		698000.0000		50000.0000	112.0		P	
Manganese	80 - 120	580.0000		59.0000	J	500.0000	104.0		P	
Nickel	80 - 120	497.0000		50.0000		500.0000	98.0		P	
Potassium	80 - 120	241000.0000		186000.0000		50000.0000	110.0		P	
Silver	80 - 120	58.1000		20.0000		50.0000	105.0		P	
Sodium	80 - 120	5790000.0000		############		50000.0000	108.0		P	
Vanadium	80 - 120	534.0000		50.0000		500.0000	103.0		P	
Zinc	80 - 120	506.0000		100.0000		500.0000	100.0		P	

N Spike sample recovery is outside control limits.

Field QC blanks only assoc.
No Quals were required

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B110556	**MS Lab Workorder:**	MEAFW - MSD
Matrix:	WATER	**MS Lab Sample ID:**	G1B100573006D
% Solids	0.0	**QC Batch ID:**	1045234
Units:	UG/L	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	4650.0000	N	2010.0000		2000.0000	132.0	N	P	NQ
Antimony	80 - 120	535.0000		200.0000		500.0000	105.0		P	
Barium	80 - 120	2090.0000		68.8000	J	2000.0000	101.0		P	
Beryllium	80 - 120	49.5000		10.0000		50.0000	99.0		P	
Cadmium	80 - 120	50.0000		10.0000		50.0000	100.0		P	
Calcium	80 - 120	652000.0000		604000.0000		50000.0000	97.0		P	
Cobalt	80 - 120	509.0000		50.0000		500.0000	101.0		P	
Copper	80 - 120	267.0000		50.0000		250.0000	102.0		P	
Iron	80 - 120	3200.0000		2040.0000		1000.0000	116.0		P	
Lead	80 - 120	480.0000		50.0000		500.0000	96.0		P	
Magnesium	80 - 120	750000.0000		698000.0000		50000.0000	103.0		P	
Manganese	80 - 120	580.0000		59.0000	J	500.0000	104.0		P	
Nickel	80 - 120	492.0000		50.0000		500.0000	97.0		P	
Potassium	80 - 120	238000.0000		186000.0000		50000.0000	104.0		P	
Silver	80 - 120	52.1000		20.0000		50.0000	93.0		P	
Sodium	80 - 120	###########	N	###########		50000.0000	0.0	N	P	NQ
Vanadium	80 - 120	536.0000		50.0000		500.0000	104.0		P	
Zinc	80 - 120	507.0000		100.0000		500.0000	100.0		P	

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-2SB06-0507-0211
Lot Number:	G1B110556	**MS Lab Workorder:**	MEC1E - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B110556007S
% Solids	92.0	**QC Batch ID:**	1046290
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	1020.0000	N	761.0000		213.0000	123.0	N	P	NQ- MSD ok
Antimony	80 - 120	51.1000		2.2000		53.3000	96.0		P	
Barium	80 - 120	203.0000		7.2000		213.0000	92.0		P	
Beryllium	80 - 120	4.2200	N	0.1100		5.3300	79.0	N	P	J/UJ
Cadmium	80 - 120	4.4100		0.1100		5.3300	83.0		P	
Calcium	80 - 120	354000.0000	N	350000.0000	RLA	5550.0000	74.0	N	P	NQ*
Chromium	80 - 120	24.5000		6.5000	B	21.3000	84.0		P	
Cobalt	80 - 120	45.2000		0.5400		53.3000	84.0		P	
Copper	80 - 120	26.3000		1.1000	J	26.7000	94.0		P	
Iron	80 - 120	1350.0000		1260.0000		107.0000	80.0		P	
Lead	80 - 120	43.8000		0.5400		53.3000	82.0		P	
Magnesium	80 - 120	15600.0000	N	11900.0000		5330.0000	70.0	N	P	J/UJ
Manganese	80 - 120	92.2000		45.6000		53.3000	87.0		P	
Nickel	80 - 120	44.2000		0.4700	J	53.3000	82.0		P	
Potassium	80 - 120	5420.0000		175.0000		5330.0000	98.0		P	
Silver	75 - 120	3.5500	N	0.2200		5.3300	66.0	N	P	J/UJ
Sodium	80 - 120	6890.0000		1940.0000		5330.0000	93.0		P	
Vanadium	80 - 120	51.3000		4.5000		53.3000	88.0		P	
Zinc	80 - 120	42.5000	N	1.7000	J	53.3000	77.0	N	P	J/UJ

N Spike sample recovery is outside control limits.

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-2SB06-0507-0211
Lot Number:	G1B110556	**MS Lab Workorder:**	MEC1E - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B110556007D
% Solids	92.0	**QC Batch ID:**	1046290
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	982.0000		761.0000		222.0000	100.0		P	
Antimony	80 - 120	52.9000		2.2000		55.5000	95.0		P	
Barium	80 - 120	210.0000		7.2000		222.0000	92.0		P	
Beryllium	80 - 120	4.4000	N	0.1100		5.5500	79.0	N	P	JWJ
Cadmium	80 - 120	4.5800		0.1100		5.5500	82.0		P	
Calcium	80 - 120	346000.0000	N	350000.0000	RLA	5550.0000	0.0	N	P	NQ*
Chromium	80 - 120	25.4000		6.5000	B	22.2000	85.0		P	
Cobalt	80 - 120	47.1000		0.5400		55.5000	84.0		P	
Copper	80 - 120	27.4000		1.1000	J	27.7000	95.0		P	
Iron	80 - 120	1270.0000	N	1260.0000		111.0000	8.9	N	P	NQ*
Lead	80 - 120	45.5000		0.5400		55.5000	82.0		P	
Magnesium	80 - 120	16200.0000	N	11900.0000		5550.0000	77.0	N	P	JWJ
Manganese	80 - 120	99.5000		45.6000		55.5000	97.0		P	
Nickel	80 - 120	45.8000		0.4700	J	55.5000	82.0		P	
Potassium	80 - 120	5630.0000		175.0000		5550.0000	98.0		P	
Silver	75 - 120	3.2600	N	0.2200		5.5500	58.0	N	P	JWJ
Sodium	80 - 120	7190.0000		1940.0000		5550.0000	95.0		P	
Vanadium	80 - 120	53.5000		4.5000		55.5000	88.0		P	
Zinc	80 - 120	44.6000	N	1.7000	J	55.5000	77.0	N	P	JWJ

N Spike sample recovery is outside control limits.

	YES	NO	N/A

as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

A.1.17.5 **Soil/Sediment**

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	* ✓	[ ]	
(b) between 10-74%?	✓	[ ]	
(c) between 126-200%?	* ✓	[ ]	
(d) greater than 200%?		[✓]	

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

* no flags were required for these analytes

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

RPD's between MS/MSDs

	YES	NO	N/A
For each SDG?	✓		
On one of the SDG samples?	✓		
For each matrix type?	✓		
For each concentration range (low or med.)?	✓		
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	✓		
Was a lab duplicate prepared and analyzed with the SDG samples?	☒		

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**: Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

	YES	NO	N/A
data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2 When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
> ± 2 x CRQL?	___	[✓]	___
> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-2SB02-0103-0211
Duplicate Sample ID: VEECA-2SB02P-0103-0211

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	5860	5060	15
arsenic	13.8	14.3	-0.5
barium	11.6	11.4	2
cadmium			0
calcium	329000	333000	1
chromium	12.8	11.4	1.4
cobalt	2.1	2.1	0
copper	7.7	7	0.7
iron	8130	7330	10
magnesium	3130	2840	10
manganese	276	319	14
nickel	3.8	3.6	0.2
potassium	1020	884	14
selenium	0.5	0.57	-0.07
sodium	179	162	10
thallium	0.063	0.063	0
vanadium	26.7	25.6	4
zinc	10.2	9.5	7

COMMENTS: No qualifications were required.
Region II QC limits for flagging were used.

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[✓]	___	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

2SB01-0103

A.1.19.5	Circle on each Appendix A.4 all values that have:			
	RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[✓]	___
	is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% but < 120%,

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	___
	> ± 4 x CRQL?	___	[___]	___
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
A.1.20	**Laboratory Control Sample (LCS)- Form VII**			
A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[___]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE:** Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[___]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x ~~MDLs~~ LOQ.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values: all analytes when criteria applies JJC 4/27/11			
	> 10%?	✗	[✓]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L, Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed? dilutions were required	[✓]	___	___
Was the %RI for the two fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[✓]	___	___

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

Hexavalent Chromium Calcs - ICAL soils - 21111

X - Response	Y - Concentration (mg/L)
0.001	0
0.005	0.005
0.009	0.01
0.022	0 025
0.042	0.05
0.082	0.1

slope, m (A1) =	1.232795153
y-int. (A0) =	-0.001413337
r =	0.999935359
Rr2=	0.999870723

VEECA-2sb06-0507-0211MS Lab Value - 0 233 mg/Kg
Response = 0.039

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0 046665674 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.23332837 mg/Kg

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/9, 2/10
Received Date: 2/11, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/25 soils, no prep. for waters
Analysis Dates: 2/25 soils, 2/11 for waters

All holding time requirements were met with the following exception. Sample VEECA-EB01-021011-SB & VEECA-EB01-021011-SW exceeded the 24 hour holding time by approximately 33 hours. The reported results were qualified as estimated J/UJ with a qualifier code of HT.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-2SB06-0507-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: veeca-2sb02-0103-0211 Duplicate Sample ID: veeca-2sb02-0103-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported for the target analyte. Three samples were reported at an elevated reporting limit due to observed matrix interference. This results were flagged with a G flag by the laboratory. This flag was crossed out and the results were reported unqualified in the final DV report. Clarification of the calculations was requested from the laboratory.

Reviewer JA Cleveland **Date:** 4/27/11

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B120421, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B120421. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-2SB14-1H3H-0211	G1B120421-001	soil	X	X	X	X	X
VEECA-2SB13-000H-0211	G1B120421-002	soil	X	X	X	X	X
VEECA-2SB15-0406-0211	G1B120421-003	soil	X	X	X	X	X
VEECA-2SB10-0204-0211	G1B120421-004	soil	X	X	X	X	X
VEECA-3SB03-0002-0211	G1B120421-005	soil	X	X	X	X	X
VEECA-3SB05-0002-0211	G1B120421-006	soil	X	X	X	X	X
VEECA-3SB01-0001-0211	G1B120421-008	soil	X	X	X	X	X
VEECA-3SB02-0001-0211	G1B120421-009	soil	X	X	X	X	X
VEECA-3SB02P-0001-0211	G1B120421-010	soil	X	X	X	X	X
VEECA-2SB11-7H9H-0211	G1B120421-011	soil	X	X	X	X	X
VEECA-2SB12-0H2H-0211	G1B120421-012	soil	X	X	X	X	X
VEECA-EB01-021111-SB	G1B120421-007	water	X	X	X	X	X
VEECA-EB02-021111-DSS	G1B120421-013	water	X	X	X	X	X
VEECA-2SB14-1H3H-0211 MS	G1B120421-001MS	soil	X	X	X	X	X
VEECA-2SB14-1H3H-0211 MSD	G1B120421-001MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB01-021111-SB and VEECA-EB02-021111-DSS - equipment blanks; and sample VEECA-3SB02P-0001-0211- field duplicate sample of sample VEECA-3SB02-0001-0211.

The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications were required to the data.

Perchlorate

No qualifications were required to the data.

Metals by 6010B & 6020

The submitted MS/MSD pair exhibited recoveries that resulted in qualifications to the soil sample results. This MS/MSD pair was in SDG G1B110556.

Please note that results in some samples were reported with raised detection limits and flagged by the laboratory due to observed matrix interferences or necessary dilution. These results were reported without validation qualifier at the higher detection limits. No additional action was required.

Hexavalent Chromium

One sample exceeded the required 24-hour holding time; therefore the reported non-detect result was qualified as estimated.

Please note that results in some samples were reported with raised detection limits and flagged by the laboratory due to observed matrix interferences. These results were reported without validation qualifier at the higher detection limits. No additional action was required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/10-11/11 and samples were received at the laboratory on 2/12/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Sample VEECA-EB01-021111-SB exceeded the 24 hour holding time by several hours; therefore the reported non-detect result was qualified as estimated UJ, with a qualifier code of HT.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-2SB06-0507-0211	beryllium	all soil samples	79/79	J/UJ	MSL
	magnesium		70/77		
	silver		66/58		
	zinc		77/77		

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	beryllium magnesium silver zinc	+/-	J/UJ	MSL

Hexavalent Chromium

Sample ID	Compound	Results	Q flag	Q Code
VEECA-EB01-021111-SB	hexavalent chromium	-	UJ	HT

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

CH2M HILL
Vieques, PR - ECA RI
SDG# G1B120421

CH2M Hill Inc

Client Sample ID: VEECA-2SB14-1H3H-0211

HPLC

Lot-Sample #...: G1B120421-001 Work Order #...: MEDGP1AX Matrix.....: SOLID
Date Sampled...: 02/10/11 09:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 06:46
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

IM 05/11/11

005

CH2M Hill Inc

Client Sample ID: VKECA-2SB13-000H-0211

HPLC

Lot-Sample #...: G1B120421-002 Work Order #...: MEDG11A4 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 07:31
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

VM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-2SB15-0406-0211

HPLC

Lot-Sample #...: G1B120421-003 Work Order #...: MEDG21A4 Matrix.....: SOLID
Date Sampled...: 02/10/11 11:50 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 08:16
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

011

CH2M Hill Inc

Client Sample ID: VERCA-2SB10-0204-0211

HPLC

Lot-Sample #...: G1B120421-004 Work Order #...: MEDG41A4 Matrix.....: SOLID
Date Sampled...: 02/10/11 13:15 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 09:01
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-3SB03-0002-0211

HPLC

Lot-Sample #...: G1B120421-005 Work Order #...: MEDG71A4 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:10 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 09:47
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-3SB05-0002-0211

HPLC

Lot-Sample #...: G1B120421-006 Work Order #...: MEDG91AF Matrix.....: SOLID
Date Sampled...: 02/10/11 14:40 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 10:35
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 05/11/11

014

CH2M Hill Inc

Client Sample ID: VEECA-3SB01-0001-0211

HPLC

Lot-Sample #...: G1B120421-008 Work Order #...: MEDHE1AM Matrix.....: SOLID
Date Sampled...: 02/11/11 10:55 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 11:20
Dilution Factor: 1
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-3SB02-0001-0211

HPLC

Lot-Sample #...: G1B120421-009 Work Order #...: MEDHH1AU Matrix.....: SOLID
Date Sampled...: 02/11/11 10:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 12:05
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

WM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VKECA-3SB02P-0001-0211

HPLC

Lot-Sample #...: G1B120421-010 Work Order #...: MEDHK1A4 Matrix.....: SOLID
Date Sampled...: 02/11/11 10:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 12:50
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

VM 05/11/11

017

CH2M Hill Inc

Client Sample ID: VEECA-2SB11-7H9H-0211

HPLC

Lot-Sample #...: G1B120421-011 Work Order #...: MEDHL1A4 Matrix.....: SOLID
Date Sampled...: 02/11/11 09:40 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 17:28
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

WM 05/11/11

018

CH2M Hill Inc

Client Sample ID: VERCA-2SB12-0H2H-0211

HPLC

Lot-Sample #...: G1B120421-012 Work Order #...: MEDHR1A4 Matrix.....: SOLID
Date Sampled...: 02/11/11 08:27 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053390 Analysis Time..: 18:13
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

WM 02/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021111-SB

HPLC

Lot-Sample #...: G1B120421-007 Work Order #...: MEDHC1A1 Matrix.....: WATER
Date Sampled...: 02/11/11 06:40 Date Received..: 02/12/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047200 Analysis Time..: 19:30
Dilution Factor: 1.04

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.052 U	0.52	ug/L	0.026
1,3,5-Trinitrobenzene	0.052 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.052 U	0.16	ug/L	0.052
2,4,6-Trinitrotoluene	0.052 U	0.16	ug/L	0.052
2,4-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2,6-Dinitrotoluene	0.052 U	0.16	ug/L	0.052
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.092
3-Nitrotoluene	0.10 U	0.52	ug/L	0.059
4-Amino-2,6-dinitrotoluene	0.052 U	0.16	ug/L	0.052
4-Nitrotoluene	0.10 U	1.0	ug/L	0.092
HMX	0.052 U	0.16	ug/L	0.037
Nitrobenzene	0.052 U	0.16	ug/L	0.052
Nitroglycerin	0.52 U	1.0	ug/L	0.34
PETN	0.52 U	1.0	ug/L	0.31
RDX	0.052 U	0.26	ug/L	0.037
Tetryl	0.052 U	0.16	ug/L	0.052

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(84 - 125)

VM 05/11/1

026

CH2M Hill Inc

Client Sample ID: VEECA-EB02-021111-DSS

HPLC

Lot-Sample #...: G1B120421-013 Work Order #...: MEDHV1AC Matrix.....: WATER
Date Sampled...: 02/11/11 12:15 Date Received..: 02/12/11
Prep Date.....: 02/16/11 Analysis Date..: 02/24/11
Prep Batch #...: 1047200 Analysis Time..: 21:00
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.049 U	0.49	ug/L	0.024
1,3,5-Trinitrobenzene	0.049 U	0.098	ug/L	0.030
1,3-Dinitrobenzene	0.049 U	0.15	ug/L	0.049
2,4,6-Trinitrotoluene	0.049 U	0.15	ug/L	0.049
2,4-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2,6-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2-Amino-4,6-dinitrotoluene	0.098 U	0.29	ug/L	0.098
2-Nitrotoluene	0.098 U	0.98	ug/L	0.086
3-Nitrotoluene	0.098 U	0.49	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.049 U	0.15	ug/L	0.049
4-Nitrotoluene	0.098 U	0.98	ug/L	0.086
HMX	0.049 U	0.15	ug/L	0.035
Nitrobenzene	0.049 U	0.15	ug/L	0.049
Nitroglycerin	0.49 U	0.98	ug/L	0.32
PETN	0.49 U	0.98	ug/L	0.29
RDX	0.049 U	0.24	ug/L	0.035
Tetryl	0.049 U	0.15	ug/L	0.049

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(84 - 125)

WM 05/11/11

021

CH2M Hill Inc

Client Sample ID: VEECA-2SB14-1H3H-0211

HPLC

Lot-Sample #...:	G1B120421-001	Work Order #...:	MEDGP1A0	Matrix.....:	SOLID
Date Sampled...:	02/10/11 09:25	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055258	Analysis Time..:	03:26		
Dilution Factor:	0.95				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.41 U	5.1	ug/kg	0.26

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

022

CH2M Hill Inc

Client Sample ID: VERCA-2SB13-000H-0211

HPLC

Lot-Sample #...:	G1B120421-002	**Work Order #...:**	MEDG11AA	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 09:55	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055258	**Analysis Time..:**	04:19		
Dilution Factor:	0.96				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.31 J	5.4	ug/kg	0.28

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

MM 042111

025

CH2M Hill Inc

Client Sample ID: VERCA-2SB15-0406-0211

HPLC

Lot-Sample #...:	G1B120421-003	Work Order #...:	MEDG21AA	Matrix.....:	SOLID
Date Sampled...:	02/10/11 11:50	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055258	Analysis Time..:	04:36		
Dilution Factor:	0.96				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.7	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

024

CH2M Hill Inc

Client Sample ID: VEECA-2SB10-0204-0211

HPLC

Lot-Sample #...:	G1B120421-004	**Work Order #...:**	MEDG41AA	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 13:15	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055258	**Analysis Time..:**	05:11		
Dilution Factor:	0.94				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.8	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

025

CH2M Hill Inc

Client Sample ID: VEECA-3SB03-0002-0211

HPLC

Lot-Sample #...:	G1B120421-005	**Work Order #...:**	MEDG71AA	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 14:10	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055258	**Analysis Time..:**	05:29		
Dilution Factor:	0.91				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.45 U	5.6	ug/kg	0.29

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

026

CH2M Hill Inc

Client Sample ID: VEECA-3SB05-0002-0211

HPLC

Lot-Sample #...:	G1B120421-006	**Work Order #...:**	MEDG91AH	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 14:40	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055258	**Analysis Time..:**	05:46		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	**0.44 U**	**5.5**	**ug/kg**	**0.29**

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 2-4-2011

027

CH2M Hill Inc

Client Sample ID: VEECA-3SB01-0001-0211

HPLC

Lot-Sample #...:	G1B120421-008	**Work Order #...:**	MEDHE1AP	**Matrix.....:**	SOLID
Date Sampled...:	02/11/11 10:55	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055258	**Analysis Time..:**	06:04		
Dilution Factor:	0.96				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.51 U	6.4	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

028

CH2M Hill Inc

Client Sample ID: VEECA-3SB02-0001-0211

HPLC

Lot-Sample #...: G1B120421-009 Work Order #...: MEDHH1AW Matrix.....: SOLID
Date Sampled...: 02/11/11 10:25 Date Received..: 02/12/11
Prep Date.....: 02/24/11 Analysis Date..: 02/27/11
Prep Batch #...: 1055258 Analysis Time..: 06:21
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.48 U	6.0	ug/kg	0.31

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 2/42/11

025

CH2M Hill Inc

Client Sample ID: VREEA-3SB02P-0001-0211

HPLC

Lot-Sample #...:	G1B120421-010	Work Order #...:	MEDHK1AA	Matrix.....:	SOLID
Date Sampled...:	02/11/11 10:25	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055258	Analysis Time..:	06:39		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.51 U	6.4	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

036

CH2M Hill Inc

Client Sample ID: VKECA-2SB11-7H9H-0211

HPLC

Lot-Sample #...:	G1B120421-011	Work Order #...:	MEDHL1AA	Matrix.....:	SOLID
Date Sampled...:	02/11/11 09:40	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055258	Analysis Time..:	06:57		
Dilution Factor:	0.97				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.48 U	6.1	ug/kg	0.31

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

031

CH2M Hill Inc

Client Sample ID: VEECA-2SB12-0H2H-0211

HPLC

Lot-Sample #...:	G1B120421-012	Work Order #...:	MEDHR1AA	Matrix.....:	SOLID
Date Sampled...:	02/11/11 08:27	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055258	Analysis Time..:	07:14		
Dilution Factor:	0.93				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.46 U	5.8	ug/kg	0.30

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

032

CH2M Hill Inc

Client Sample ID: VERCA-EB01-021111-SB

Dissolved HPLC

Lot-Sample #...:	G1B120421-007	**Work Order #...:**	MEDHC2A0	**Matrix.....:**	WATER
Date Sampled...:	02/11/11 06:40	**Date Received..:**	02/12/11		
Prep Date.....:	02/22/11	**Analysis Date..:**	02/23/11		
Prep Batch #...:	1053108	**Analysis Time..:**	02:29		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042111

035

CH2M Hill Inc

Client Sample ID: VEECA-EB02-021111-DSS

Dissolved HPLC

Lot-Sample #...:	G1B120421-013	**Work Order #...:**	MEDHV2AA	**Matrix.....:**	WATER
Date Sampled...:	02/11/11 12:15	**Date Received..:**	02/12/11		
Prep Date.....:	02/22/11	**Analysis Date..:**	02/23/11		
Prep Batch #...:	1053108	**Analysis Time..:**	02:46		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	**0.25 U**	**0.50**	**ug/L**	**0.082**

034

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB14-1H3H-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDGP
Matrix:	SOIL	**Lab Sample ID:**	G1B120421001
% Solids:	93.7	**Date/Time Collected:**	02/10/11 9:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	6160.0000			P
7440-36-0	Antimony	2.1000	U		P
7440-38-2	Arsenic	3.9000			P
7440-39-3	Barium	12.8000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	320000.00	~~RLA~~		P
7440-47-3	Chromium	12.9000	~~B~~		P
7440-48-4	Cobalt	4.7000			P
7440-50-8	Copper	10.8000			P
7439-89-6	Iron	10500.000			P
7439-92-1	Lead	0.3100	J		P
7439-95-4	Magnesium	3030.0000		J MSL	P
7439-96-5	Manganese	175.0000			P
7440-02-0	Nickel	4.8000			P
7440-09-7	Potassium	840.0000			P
7782-49-2	Selenium	0.4800			P
7440-22-4	Silver	0.2100	~~U~~	UJ MSL	P
7440-23-5	Sodium	587.0000			P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	32.3000			P
7440-66-6	Zinc	12.7000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB13-000H-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDG1
Matrix:	SOIL	**Lab Sample ID:**	G1B120421002
% Solids:	89.0	**Date/Time Collected:**	02/10/11 9:55
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	9210.0000			P
7440-36-0	Antimony	2.2000	U		P
7440-38-2	Arsenic	3.9000			P
7440-39-3	Barium	16.0000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	255000.00	~~RLA~~		P
7440-47-3	Chromium	17.8000	~~B~~		P
7440-48-4	Cobalt	3.0000			P
7440-50-8	Copper	11.9000			P
7439-89-6	Iron	9290.0000			P
7439-92-1	Lead	0.5600	U		P
7439-95-4	Magnesium	8550.0000		J MSL	P
7439-96-5	Manganese	211.0000			P
7440-02-0	Nickel	4.7000			P
7440-09-7	Potassium	1970.0000			P
7782-49-2	Selenium	0.6300			P
7440-22-4	Silver	0.2200	~~U~~	UJ MSL	P
7440-23-5	Sodium	1300.0000			P
7440-28-0	Thallium	0.0560	J		P
7440-62-2	Vanadium	19.8000			P
7440-66-6	Zinc	15.2000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
RLA The reporting limit for this analyte is elevated due to sample dilution.
Results and reporting limits have been adjusted for dry weight

JC 4/22/11

036

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB15-0406-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDG2
Matrix:	SOIL	**Lab Sample ID:**	G1B120421003
% Solids:	84.0	**Date/Time Collected:**	02/10/11 11:50
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	8660.0000			P
7440-36-0	Antimony	2.4000	U		P
7440-38-2	Arsenic	20.6000			P
7440-39-3	Barium	14.7000			P
7440-41-7	Beryllium	0.0430	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	270000.00	~~RLA~~		P
7440-47-3	Chromium	17.1000	~~B~~		P
7440-48-4	Cobalt	8.5000			P
7440-50-8	Copper	18.7000			P
7439-89-6	Iron	15200.000			P
7439-92-1	Lead	1.2000	~~G~~U		P
7439-95-4	Magnesium	4350.0000		J MSL	P
7439-96-5	Manganese	250.0000			P
7440-02-0	Nickel	8.2000			P
7440-09-7	Potassium	1460.0000			P
7782-49-2	Selenium	0.7200			P
7440-22-4	Silver	0.2400	~~U~~	UJ MSL	P
7440-23-5	Sodium	1580.0000			P
7440-28-0	Thallium	0.1200	U		P
7440-62-2	Vanadium	42.2000			P
7440-66-6	Zinc	21.0000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 4/22/11

037

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB10-0204-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDG4
Matrix:	SOIL	**Lab Sample ID:**	G1B120421004
% Solids:	82.0	**Date/Time Collected:**	02/10/11 13:15
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	11700.000			P
7440-36-0	Antimony	2.5000	U		P
7440-38-2	Arsenic	5.8000			P
7440-39-3	Barium	15.2000			P
7440-41-7	Beryllium	0.0770	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	195000.00	~~RLA~~		P
7440-47-3	Chromium	26.6000	~~B~~		P
7440-48-4	Cobalt	12.1000			P
7440-50-8	Copper	14.7000			P
7439-89-6	Iron	13900.000			P
7439-92-1	Lead	0.6100	U		P
7439-95-4	Magnesium	8400.0000		J MSL	P
7439-96-5	Manganese	485.0000			P
7440-02-0	Nickel	8.9000			P
7440-09-7	Potassium	2210.0000			P
7782-49-2	Selenium	0.5200			P
7440-22-4	Silver	0.2500	~~U~~	UJ MSL	P
7440-23-5	Sodium	3470.0000			P
7440-28-0	Thallium	0.0770	J		P
7440-62-2	Vanadium	44.4000			P
7440-66-6	Zinc	17.3000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JMC 4/22/11

038

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB03-0002-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDG7
Matrix:	SOIL	**Lab Sample ID:**	G1B120421005
% Solids:	82.0	**Date/Time Collected:**	02/10/11 14:10
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	20200.000			P
7440-36-0	Antimony	2.4000	U		P
7440-38-2	Arsenic	7.1000			P
7440-39-3	Barium	21.9000			P
7440-41-7	Beryllium	0.1800	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	164000.00	~~RLA~~		P
7440-47-3	Chromium	37.5000	~~B~~		P
7440-48-4	Cobalt	9.1000			P
7440-50-8	Copper	20.3000			P
7439-89-6	Iron	21500.000			P
7439-92-1	Lead	0.6100	U		P
7439-95-4	Magnesium	7020.0000		J MSL	P
7439-96-5	Manganese	537.0000			P
7440-02-0	Nickel	11.2000			P
7440-09-7	Potassium	3870.0000			P
7782-49-2	Selenium	0.5200			P
7440-22-4	Silver	0.2400	~~U~~	UJ MSL	P
7440-23-5	Sodium	3010.0000			P
7440-28-0	Thallium	0.0770	J		P
7440-62-2	Vanadium	66.7000			P
7440-66-6	Zinc	26.4000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JLC 4/22/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB05-0002-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDG9
Matrix:	SOIL	**Lab Sample ID:**	G1B120421006
% Solids:	90.0	**Date/Time Collected:**	02/10/11 14:40
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	975.0000			P
7440-36-0	Antimony	2.2000	U		P
7440-38-2	Arsenic	1.7000	~~C~~U		P
7440-39-3	Barium	8.1000			P
7440-41-7	Beryllium	0.1100	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1100	U		P
7440-70-2	Calcium	334000.00	~~RLA~~		P
7440-47-3	Chromium	6.7000	~~B~~		P
7440-48-4	Cobalt	0.5600	U		P
7440-50-8	Copper	2.2000			P
7439-89-6	Iron	1720.0000			P
7439-92-1	Lead	0.5600	U		P
7439-95-4	Magnesium	10400.000		J MSL	P
7439-96-5	Manganese	46.7000			P
7440-02-0	Nickel	0.4900	J		P
7440-09-7	Potassium	240.0000			P
7782-49-2	Selenium	0.4000			P
7440-22-4	Silver	0.2200	~~U~~	UJ MSL	P
7440-23-5	Sodium	2720.0000			P
7440-28-0	Thallium	0.1100	U		P
7440-62-2	Vanadium	4.4000			P
7440-66-6	Zinc	3.0000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

046

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-021111-SB
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHC
Matrix:	WATER	**Lab Sample ID:**	G1B120421007
% Solids:	0.0	**Date/Time Collected:**	02/11/11 6:40
Units:	UG/L	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

JAC 4/22/11

041

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB01-0001-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHE
Matrix:	SOIL	**Lab Sample ID:**	G1B120421008
% Solids:	75.0	**Date/Time Collected:**	02/11/11 10:55
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1940.0000			P
7440-36-0	Antimony	2.7000	U		P
7440-38-2	Arsenic	2.0000	~~G~~U		P
7440-39-3	Barium	9.6000			P
7440-41-7	Beryllium	0.1300	~~U~~	UJ MSL	P
7440-43-9	Cadmium	0.1300	U		P
7440-70-2	Calcium	328000.00	~~RLA~~		P
7440-47-3	Chromium	8.5000	~~B~~		P
7440-48-4	Cobalt	0.3600	J		P
7440-50-8	Copper	2.7000			P
7439-89-6	Iron	1560.0000			P
7439-92-1	Lead	3.3000	~~G~~U		P
7439-95-4	Magnesium	9080.0000		J MSL	P
7439-96-5	Manganese	47.4000			P
7440-02-0	Nickel	0.8400	J		P
7440-09-7	Potassium	550.0000			P
7782-49-2	Selenium	0.7000			P
7440-22-4	Silver	0.2700	~~U~~	UJ MSL	P
7440-23-5	Sodium	4040.0000			P
7440-28-0	Thallium	0.1300	U		P
7440-62-2	Vanadium	4.7000			P
7440-66-6	Zinc	3.0000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JMC 4/22/11

042

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB02-0001-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHH
Matrix:	SOIL	**Lab Sample ID:**	G1B120421009
% Solids:	83.0	**Date/Time Collected:**	02/11/11 10:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	14900.000			P
7440-36-0	Antimony	2.4000	U		P
7440-38-2	Arsenic	5.8000			P
7440-39-3	Barium	12.3000			P
7440-41-7	Beryllium	0.1100	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	179000.00	~~RLA~~		P
7440-47-3	Chromium	30.1000	~~B~~		P
7440-48-4	Cobalt	5.7000			P
7440-50-8	Copper	11.7000			P
7439-89-6	Iron	15400.000			P
7439-92-1	Lead	0.6000	U		P
7439-95-4	Magnesium	5750.0000		J MSL	P
7439-96-5	Manganese	149.0000			P
7440-02-0	Nickel	8.9000			P
7440-09-7	Potassium	4370.0000			P
7782-49-2	Selenium	0.2900	J		P
7440-22-4	Silver	0.2400	~~U~~	UJ MSL	P
7440-23-5	Sodium	4500.0000			P
7440-28-0	Thallium	0.0910	J		P
7440-62-2	Vanadium	43.3000			P
7440-66-6	Zinc	16.9000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

045

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB02P-0001-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHK
Matrix:	SOIL	**Lab Sample ID:**	G1B120421010
% Solids:	78.0	**Date/Time Collected:**	02/11/11 10:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16000.000			P
7440-36-0	Antimony	2.6000	U		P
7440-38-2	Arsenic	13.5000			P
7440-39-3	Barium	13.0000			P
7440-41-7	Beryllium	0.1300	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1300	U		P
7440-70-2	Calcium	162000.00	~~RLA~~		P
7440-47-3	Chromium	31.3000	~~B~~		P
7440-48-4	Cobalt	6.7000			P
7440-50-8	Copper	13.3000			P
7439-89-6	Iron	16800.000			P
7439-92-1	Lead	0.6400	U		P
7439-95-4	Magnesium	6310.0000		J MSL	P
7439-96-5	Manganese	149.0000			P
7440-02-0	Nickel	10.0000			P
7440-09-7	Potassium	4500.0000			P
7782-49-2	Selenium	0.5700			P
7440-22-4	Silver	0.2600	~~U~~	UJ MSL	P
7440-23-5	Sodium	4570.0000			P
7440-28-0	Thallium	0.0930	J		P
7440-62-2	Vanadium	49.2000			P
7440-66-6	Zinc	18.8000		J MSL	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

044

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB11-7H9H-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHL
Matrix:	SOIL	**Lab Sample ID:**	G1B120421011
% Solids:	80.0	**Date/Time Collected:**	02/11/11 9:40
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	14100.000			P
7440-36-0	Antimony	2.5000	U		P
7440-38-2	Arsenic	14.3000			P
7440-39-3	Barium	14.7000			P
7440-41-7	Beryllium	0.4000		J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	21700.000			P
7440-47-3	Chromium	50.1000	~~B~~		P
7440-48-4	Cobalt	19.4000			P
7440-50-8	Copper	42.8000			P
7439-89-6	Iron	36400.000			P
7439-92-1	Lead	2.3000			P
7439-95-4	Magnesium	6770.0000		J MSL	P
7439-96-5	Manganese	302.0000			P
7440-02-0	Nickel	16.1000			P
7440-09-7	Potassium	2340.0000			P
7782-49-2	Selenium	0.6400			P
7440-22-4	Silver	0.2500	~~U~~	UJ MSL	P
7440-23-5	Sodium	4230.0000			P
7440-28-0	Thallium	0.0900	J		P
7440-62-2	Vanadium	86.3000			P
7440-66-6	Zinc	43.0000		J MSL	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

Results and reporting limits have been adjusted for dry weight

JAC 4/22/11

U45

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SB12-0H2H-0211
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHR
Matrix:	SOIL	**Lab Sample ID:**	G1B120421012
% Solids:	80.0	**Date/Time Collected:**	02/11/11 8:27
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15000.000			P
7440-36-0	Antimony	2.5000	U		P
7440-38-2	Arsenic	7.0000			P
7440-39-3	Barium	12.7000			P
7440-41-7	Beryllium	0.1200	~~J~~	J MSL	P
7440-43-9	Cadmium	0.1200	U		P
7440-70-2	Calcium	167000.00	~~RLA~~		P
7440-47-3	Chromium	28.9000	~~B~~		P
7440-48-4	Cobalt	7.1000			P
7440-50-8	Copper	16.0000			P
7439-89-6	Iron	16600.000			P
7439-92-1	Lead	0.6200	U		P
7439-95-4	Magnesium	6830.0000		J MSL	P
7439-96-5	Manganese	240.0000			P
7440-02-0	Nickel	8.4000			P
7440-09-7	Potassium	3180.0000			P
7782-49-2	Selenium	0.6400			P
7440-22-4	Silver	0.2500	~~U~~	UJ MSL	P
7440-23-5	Sodium	3030.0000			P
7440-28-0	Thallium	0.0700	J		P
7440-62-2	Vanadium	48.4000			P
7440-66-6	Zinc	20.8000		J MSL	P

U Result is less than the reporting limit (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JMC 4/20/11

046

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB02-021111-DSS
Lot Number:	G1B120421	**Lab WorkOrder:**	MEDHV
Matrix:	WATER	**Lab Sample ID:**	G1B120421013
% Solids:	0.0	**Date/Time Collected:**	02/11/11 12:15
Units:	UG/L	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	52.2000	J		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.

JPC 42211

047

CH2M Hill Inc

Client Sample ID: VEECA-2SB14-1H3H-0211

General Chemistry

Lot-Sample #...: G1B120421-001 Work Order #...: MEDGP Matrix.....: SOLID
Date Sampled...: 02/10/11 09:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.13 U ~~G~~	0.27	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 5		Analysis Time..: 17:40	DL.....: 0.053	
Percent Moisture	6.3	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JC 4/23/11

U48

CH2M Hill Inc

Client Sample ID: VERCA-2SB13-000H-0211

General Chemistry

Lot-Sample #...: G1B120421-002 Work Order #...: MEDG1 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.028 U	0.056	mg/kg	SW846 7196A	02/25/11	1055326
	Dilution Factor: 1			Analysis Time..: 17:40	DL.....: 0.011	
Percent Moisture	10.9	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/23/11

045

CH2M Hill Inc

Client Sample ID: VEECA-2SB15-0406-0211

General Chemistry

Lot-Sample #...: G1B120421-003 Work Order #...: MEDG2 Matrix.....: SOLID
Date Sampled...: 02/10/11 11:50 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.15 U G	0.30	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 5		Analysis Time..: 17:41	DL.....: 0.059	
Percent Moisture	15.6	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JC 4/23/11

050

CH2M Hill Inc

Client Sample ID: VEECA-2SB10-0204-0211

General Chemistry

Lot-Sample #...: G1B120421-004 Work Order #...: MEDG4 Matrix.....: SOLID
Date Sampled...: 02/10/11 13:15 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.031 U	0.061	mg/kg	SW846 7196A	02/25/11	1055326
	Dilution Factor: 1			Analysis Time..: 17:41	DL.....: 0.012	
Percent Moisture	18.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JC 4/23/11

051

CH2M Hill Inc

Client Sample ID: VEECA-3SB03-0002-0211

General Chemistry

Lot-Sample #...: G1B120421-005 Work Order #...: MEDG7 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:10 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	9.5	0.12	--	SW846 9045C	02/24/11	1055331
		Dilution Factor: 1		Analysis Time..: 16:45	DL.....: 0.12	
Hexavalent Chromium	0.031 U	0.061	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 1		Analysis Time..: 17:42	DL.....: 0.012	
Percent Moisture	18.3	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:56	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/23/11

052

CH2M Hill Inc

Client Sample ID: VEECA-3SB05-0002-0211

General Chemistry

Lot-Sample #...: G1B120421-006 Work Order #...: MEDG9 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:40 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.9	0.11	--	SW846 9045C	02/24/11	1055331
		Dilution Factor: 1		Analysis Time..: 16:49	DL.....: 0.11	
Hexavalent Chromium	0.028 U	0.056	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 1		Analysis Time..: 17:43	DL.....: 0.011	
Percent Moisture	10.4	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JLC 4/23/11

055

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021111-SB

General Chemistry

Lot-Sample #...: G1B120421-007 Work Order #...: MEDHC Matrix.....: WATER
Date Sampled...: 02/11/11 06:40 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~B~~ UJ HT	10.0	ug/L	SW846 7196A	02/12/11	1043054

Dilution Factor: 1 Analysis Time..: 11:54 DL.....: 2.0

JJC 42311

054

CH2M Hill Inc

Client Sample ID: VERCA-3SB01-0001-0211

General Chemistry

Lot-Sample #...: G1B120421-008 Work Order #...: MEDHE Matrix.....: SOLID
Date Sampled...: 02/11/11 10:55 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	10.4	0.13	--	SW846 9045C	02/24/11	1055331
		Dilution Factor: 1		Analysis Time..: 16:53	DL.....: 0.13	
Hexavalent Chromium	0.033 U	0.066	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 1		Analysis Time..: 17:44	DL.....: 0.013	
Percent Moisture	24.7	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JC 42311

055

CH2M Hill Inc

Client Sample ID: VEECA-3SB02-0001-0211

General Chemistry

Lot-Sample #...: G1B120421-009 Work Order #...: MEDHH Matrix.....: SOLID
Date Sampled...: 02/11/11 10:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	9.6	0.12	--	SW846 9045C	02/24/11	1055331
		Dilution Factor: 1		Analysis Time..: 16:58	DL.....: 0.12	
Hexavalent Chromium	0.030 U	0.060	mg/kg	SW846 7196A	02/25/11	1055326
		Dilution Factor: 1		Analysis Time..: 17:44	DL.....: 0.012	
Percent Moisture	17.2	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JMC 12311

056

CH2M Hill Inc

Client Sample ID: VEBCA-3SB02P-0001-0211

General Chemistry

Lot-Sample #...: G1B120421-010 Work Order #...: MEDHK Matrix.....: SOLID
Date Sampled...: 02/11/11 10:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.032 U	0.064	mg/kg	SW846 7196A	02/25/11	1055326
	Dilution Factor: 1			Analysis Time..: 17:45	DL.....: 0.013	
Percent Moisture	22.4	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JLC 4/23/11

057

CH2M Hill Inc

Client Sample ID: VEECA-2SB11-7H9H-0211

General Chemistry

Lot-Sample #...: G1B120421-011 Work Order #...: MEDHL Matrix.....: SOLID
Date Sampled...: 02/11/11 09:40 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.031 U	0.062	mg/kg	SW846 7196A	02/25/11	1055326
	Dilution Factor: 1			Analysis Time..: 17:45	DL.....: 0.012	
Percent Moisture	19.9	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 42311

CH2M Hill Inc

Client Sample ID: VERCA-2SB12-0H2H-0211

General Chemistry

Lot-Sample #...: G1B120421-012 Work Order #...: MEDHR Matrix.....: SOLID
Date Sampled...: 02/11/11 08:27 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.031 U	0.062	mg/kg	SW846 7196A	02/25/11	1055326
	Dilution Factor: 1			Analysis Time..: 17:46	DL.....: 0.012	
Percent Moisture	19.8	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
	Dilution Factor: 1			Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 12311

055

CH2M Hill Inc

Client Sample ID: VERCA-EB02-021111-DSS

General Chemistry

Lot-Sample #...: G1B120421-013 Work Order #...: MEDHV Matrix.....: WATER
Date Sampled...: 02/11/11 12:15 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/12/11	1043054

Dilution Factor: 1 Analysis Time..: 11:55 DL.....: 2.0

JAC 42311

066

Case Narrative

TestAmerica West Sacramento Project Number G1B120421

General Comments

These samples were received at 1 degree Celsius and the temperature blanks at 0 degrees Celsius. Wet ice was used as a cooling agent.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Please note sample VEECA-EB01-021111-SB was received past the 24 hour recommended holding time for hexavalent chromium. The client was notified and verified that the laboratory should proceed with the analysis.

WATER, 8330B, Nitroaromatics & Nitramines
Samples: 7, 13
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: METEM1AC
SMCS: METEM1AD

WATER, 6850/DOD Handbook, Perchlorate
Samples: 7, 13
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MENAK1AC
SMCS: MENAK1AD

061

Case Narrative

TestAmerica West Sacramento Project Number G1B120421

SOLID, 6010B, Metals
Samples: 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12
The recoveries for aluminum, beryllium, calcium, iron, magnesium, silver and zinc are outside the established control limits for the MS/MSD associated with this batch. The concentrations of calcium and iron in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

The method blank associated with this extraction batch has chromium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

WATER, 7196A, Hexavalent Chromium
Samples: 1, 3
The noted samples required a 5x dilution due to matrix interference. The results are non-detect at an elevated reporting limit.

Sample: 7
The noted sample was received in the laboratory after the recommended 24 hour holding time for the test had expired. The sample was analyzed after consultation with the client.

There are no other anomalies associated with this project.

062

Sample Summary

TestAmerica West Sacramento Project Number G1B120421

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEDGP	1	VEECA-2SB14-1H3H-0211	2/10/2011 09:25 AM	2/12/2011 11:00 AM
MEDG1	2	VEECA-2SB13-000H-0211	2/10/2011 09:55 AM	2/12/2011 11:00 AM
MEDG2	3	VEECA-2SB15-0406-0211	2/10/2011 11:50 AM	2/12/2011 11:00 AM
MEDG4	4	VEECA-2SB10-0204-0211	2/10/2011 01:15 PM	2/12/2011 11:00 AM
MEDG7	5	VEECA-3SB03-0002-0211	2/10/2011 02:10 PM	2/12/2011 11:00 AM
MEDG9	6	VEECA-3SB05-0002-0211	2/10/2011 02:40 PM	2/12/2011 11:00 AM
MEDHC	7	VEECA-EB01-021111-SB	2/11/2011 06:40 AM	2/12/2011 11:00 AM
MEDHE	8	VEECA-3SB01-0001-0211	2/11/2011 10:55 AM	2/12/2011 11:00 AM
MEDHH	9	VEECA-3SB02-0001-0211	2/11/2011 10:25 AM	2/12/2011 11:00 AM
MEDHK	10	VEECA-3SB02P-0001-0211	2/11/2011 10:25 AM	2/12/2011 11:00 AM
MEDHL	11	VEECA-2SB11-7H9H-0211	2/11/2011 09:40 AM	2/12/2011 11:00 AM
MEDHR	12	VEECA-2SB12-0H2H-0211	2/11/2011 08:27 AM	2/12/2011 11:00 AM
MEDHV	13	VEECA-EB02-021111-DSS	2/11/2011 12:15 PM	2/12/2011 11:00 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

065

G1B120421

G1B120421

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1376

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8747 2112 6688

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info: FEDEX UPS CLIENT
Airbill No:
Temp C: Temp Blank Intact Not Intact

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for vigilant	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)			1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MS			8330 Metals + pH, "Metals Only" for battery disposal area			Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace			None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
1	VEECA-2SB14-1H3H-0211	02-10-11 0925	sb	1				1													
2	VEECA-2SB13-000H-0211	02-10-11 0955	sb	1				1													
3	VEECA-2SB15-0406-0211	02-10-11 1150	sb	1				1													
4	VEECA-2SB10-0204-0211	02-10-11 1315	sb	1				1													
5	VEECA-3SB03-0002-0211	02-10-11 1410	sb	1				1		1											
6	VEECA-3SB05-0002-0211	02-10-11 1440	sb	1				1		1											
7	VEECA-EB01-021111-SS	02-11-11 0640	AQ	5								2	1	1	1						

02/11/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/11/11 1300	FedEx				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	2-12-11 1100					

064

G1B120421

G1B 120421

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swentzirth Contact: Victoria Weber	Contract: N62470-08-D-1000	Phone #: (757) 671-6208	Fax #: (773) 695-1378
Address: 5700 Cleveland St, Suite 101	City: Virginia Beach	State:VA	Zip Code: 23462
Project #: 408040.FI.FK.EC	Proj. Name/No.: ECA-RI		Airbill number: 8736 9313 4150
Bill (if different than above): CH2M HILL Inc, A/P	Address: PO Box 241329, Denver, CO 80224		
Sampler (Print/Sign): Dia Whitaker			Copies To:

LAB USE ONLY

Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX | UPS | CLIENT
Temp Blank | Intact | Not Intact

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for sediments	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List (ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
8	VEECA-3SB01-0001-0211	02-11-11 1055	sb	1				1		1											
9	VEECA-3SB02-0001-0211	02-11-11 1025	sb	1				1		1											
10	VEECA-3SB02P-0001-0211	02-11-11 1026	sb	1				1													
11	VEECA-2SB11-7H9H-0211	02-11-11 0940	sb	1				1													
12	VEECA-2SB12-0H2H-0211	02-11-11 0827	sb	1				1													
13	VEECA-EB02-021111-DSS	02-11-11 1215	AQ	5									2	1	1	1					

02/11/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time 02/11/11 1300	Received By: FedEx	Relinquished By:	Date/Time		Received By:
Relinquished By:	Date/Time 2-12-11 1100	Received By:	Relinquished By:	Date/Time		Received By:

G1B120421

TestAmerica West Sacramento (916) 373 - 5600

065

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2MHill PM KS LOG # 69343

LOT# (QUANTIMS ID) G1B 120421 QUOTE# 88113 LOCATION W22B

Checked (✓)

DATE RECEIVED 2-12-11 TIME RECEIVED 1100 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: See temp. sheet

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials: OK Date: 2-12-11

---

pH MEASURED ☑ YES ok ☐ ANOMALY ☐ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☐ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: OK Date: 2-12-11

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

QA-185 10/09 RKE Page 1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2MHill LOT# (QUANTIMS ID): A1B120421

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600154 ☑

COC #(S) ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 2 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑

==========

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) ~~600164~~ 600151, 600152 ☑

COC #(S) ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

==========

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S) ☐

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

Initials: CA Date: 2-12-11

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B120421

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB							2						2							
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ	1	1	1	1	1	1		1	1	1	1	1								
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn							1						1							
500PJna																				
500PJzn/na																				
250PJ							2						2							
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

G1B120421

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B120421

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X		X																			
			X		X																			
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12	pH ≥12

1B

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B120421

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

S – 2/10-11/11 P – 2/16-22/11
R – 2/12/11 A – 2/24-25/11

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

072

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? ✓ ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? windows not provided only std dev + value ___ ___ ✓

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [✓] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

No MS/MSD for sample in SDG

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [ ] ___ ✓

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [ ] ___ ✓

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ✓

b. Waste [ ] ___ ✓

c. Soil/Solid [ ] ___ ✓

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [ ] ___ ✓

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [ ] ___ ✓

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [ ] ___ ✓

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

078

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Soil
___out of _

Soil MS submitted from other SDG - all rec. in

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

Soil
__out of__

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-021111-SB
VEECA-EB02-021111-DSS
> MO ⊕

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro C18 RP

column 2: Synergi Hydro C18 RP

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [ ] ___ [✓]

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

082

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ✓ ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ✓ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ✓ ___ ___

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). ✓ ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? ✓ ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence ✓ ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ 14 ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

Not provided w/ daily RTW data validator checked Cal in sequence and compared RT to check stability —OK

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines)

Men log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ [✓]

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? ✓ ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ ✓ ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. ✓ ___ ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

VEECA-3SB02-0001-0211
VEECA-3SB02P-0001-0211 > no ⊖

Field Triplicate →
not submitted for this data pkg

096

Initial Calibration Date: 1/9/2011

RRF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 48.9000

Height of Compound	2445
Conc. of Compound	50
Calculated RF	48.900

Compound Name: nitrobenzene
Lab Value: 9.1

RF of STD 1	79.20
RF of STD 2	78.60
RF of STD 3	73.50
RF of STD 4	73.10
RF of STD 5	70.20
RF of STD 6	72.35
RF of STD 7	66.88
RF of STD 8	59.02
Calculated % RSD	9.1

Continuing Calibration File ID: 2/24/11, 20:15

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	10193
Conc. of Compound	100
Calculated RF	101.930

Compound Name: tertyl
Lab Value: 10

Average RF	92.905
RF of CCV	101.930
Calculated % D	-10

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22	For all lots analyzed on LC10.							
23								
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365718-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/18/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/10-11/11
Received Date: 2/12/11
Prep Date: 2/22-24/11
Analysis Dates: 2/23-27/11
Cooler Temp: 0-2°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

All method and/or grinding blanks exhibited no contamination-no qualifications required. Associated QC blanks were: VEECA-EB01-021111-SB and VEECA-EB02-021111-DSS (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-2SB14-1H3H-0211-all criteria met.

Field Duplicate Sample

A field duplicate was submitted for VEECA-3SB02-0001-0211-no positive results were exhibited, no qualifications.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer Laura Mazzucchetti **Date:** 4/21/11

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]	___	✓ Not CLP
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]	___	✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]	___	✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/~~Sample Traffic~~ Report**			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]	___	✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[___]	___	✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

lab used their own software to generate forms — they are nothing like CLP forms

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	✓
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.? lot #	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?		[ ]	✓
(d) Cyanide?		[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments? *Values present - not validated	✓*		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?		[ ]	✓
	Mercury analysis(28 days) exceeded?		[✓]	
	Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

		YES	NO	N/A
A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	[✓]		
	Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[___]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

LODs & LOQs with ND results reported to LOD.

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B120421

ICP - AES	
SAMPLE ID	veeca-2sb12-0h2h-0211
ANALYTE	aluminum
Lab Value CONCENTRATION (mg/Kg)	15000
AMOUNT FROM RAW DATA (ug/ml)	114.79
SAMPLE SIZE (g)	0.97
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.8
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	14793

ICP-MS	
SAMPLE ID	VEECA-3SB01-001-0211
ANALYTE	selenium
Lab Value CONCENTRATION (mg/Kg)	0.7
AMOUNT FROM RAW DATA (ug/L)	6.005045
SAMPLE SIZE (g)	1.05
FINAL VOLUME (L)	0.1
DILUTION FACTOR	1
DRYNESS FACTOR	0.817
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	0.70001

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓]	___	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were performed as necessary.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]	___	✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]	___	✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NC	N/A
	Mercury Analysis?	[ ]		✓
	Cyanide Analysis?	[ ]		✓
	ICP-AES (more than 2 point Calib.)?	[ ]		✓
	ICP-MS (more than 2 point calib.)?	[✓]		
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ". **NOTE**: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]		
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[ ]		✓
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]		
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[ ]		✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the ~~final~~ CCV/CCB and once every ~~20 analytical~~ samples in the ~~analytical~~ run for each analysis? [✓] ___ ___

frequency per lab SOP/method

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B170553_LLQS.pdf; G1B170426_LLQS.pdf; G1B120440_LLQS.pdf; G1B120421_LLQS.pdf; G1B110556_LLQS.pdf

Hi Jackie,
Attached are the next 5 files of data for this project.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

un assoc. stds.

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[___]	___	✓
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	___	[___]	✓
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[___]	✓
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[___]	✓
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL?

	YES	NO	N/A
	✓	[✓]	___

QC 42211

ACTION:
If yes, change sample result ≥ MDL

No Quals required all results in samples >> LOD

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1B150000290B
Lot Number:	G1B120421	**Lab WorkOrder:**	MEF6A
Matrix:	SOIL	**Lab Sample ID:**	G1B150000290B
Instrument Id:	T01	**Analysis Date/Time:**	2/18/2011 10:58:00AM
Units:	MG/KG		

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	25.0000	U	P
Chromium	0.1500	J	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	5.0000	U	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	25.0000	U	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

No Quals - all sample results >> LOD.

Result is less than the reporting limit (RL)
Estimated Result. Result is less than RL.

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[___]	✓

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]		
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]		
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]		
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of ~~CRQL~~ LOD of the true/established mean value?	[✓]		
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[ ]		✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	✓	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

associated soil spike is client/site specific sample VEECA-25B06-0507-0211 from Job # G1B110556. This spike pair is used to assess Matrix effects for this SDG

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	✓	[ ]	

ACTION:
If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.

For H_2O (rinse blank) samples one of the rinse blanks was spiked for ICP AES & ICP MS. - not used as LCS results were fine.

A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[ ]	✓	

NOTE:
Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.

	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]		

lab limits

ACTION:
If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.

A.1.17.4 **Aqueous**

Are any spike recoveries:

(a) less than 30%?		[✓]	
(b) between 30-74%?		[✓]	
(c) between 126-150%?		[✓]	
(d) greater than 150%?		[✓]	

ACTION:
If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects

VEECA-2SB04-0507-0211 from G1B110556

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B120421	**MS Lab Workorder:**	MEC1E - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B110556007S
% Solids	92.0	**QC Batch ID:**	1046290
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	1020.0000	N	761.0000		213.0000	123.0	N	P	NQ
Antimony	80 - 120	51.1000		2.2000		53.3000	96.0		P	
Barium	80 - 120	203.0000		7.2000		213.0000	92.0		P	
Beryllium	80 - 120	4.2200	N	0.1100		5.3300	79.0	N	P	JWJ
Cadmium	80 - 120	4.4100		0.1100		5.3300	83.0		P	
Calcium	80 - 120	354000.0000	N	350000.0000	RLA	5550.0000	74.0	N	P	NQ*
Chromium	80 - 120	24.5000		6.5000	B	21.3000	84.0		P	
Cobalt	80 - 120	45.2000		0.5400		53.3000	84.0		P	
Copper	80 - 120	26.3000		1.1000	J	26.7000	94.0		P	
Iron	80 - 120	1350.0000		1260.0000		107.0000	80.0		P	
Lead	80 - 120	43.8000		0.5400		53.3000	82.0		P	
Magnesium	80 - 120	15600.0000	N	11900.0000		5330.0000	70.0	N	P	JWJ
Manganese	80 - 120	92.2000		45.6000		53.3000	87.0		P	
Nickel	80 - 120	44.2000		0.4700	J	53.3000	82.0		P	
Potassium	80 - 120	5420.0000		175.0000		5330.0000	98.0		P	
Silver	75 - 120	3.5500	N	0.2200		5.3300	66.0	N	P	JWJ
Sodium	80 - 120	6890.0000		1940.0000		5330.0000	93.0		P	
Vanadium	80 - 120	51.3000		4.5000		53.3000	88.0		P	
Zinc	80 - 120	42.5000	N	1.7000	J	53.3000	77.0	N	P	JWJ

N Spike sample recovery is outside control limits.

VEECA-2SB06-0507-0211 from G1B110556

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	LAB MS/MSD
Lot Number:	G1B120421	**MS Lab Workorder:**	MEC1E - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B110556007D
% Solids	92.0	**QC Batch ID:**	1046290
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	982.0000		761.0000		222.0000	100.0		P	
Antimony	80 - 120	52.9000		2.2000		55.5000	95.0		P	
Barium	80 - 120	210.0000		7.2000		222.0000	92.0		P	
Beryllium	80 - 120	4.4000	N	0.1100		5.5500	79.0	N	P	JNJ
Cadmium	80 - 120	4.5800		0.1100		5.5500	82.0		P	
Calcium	80 - 120	346000.0000	N	350000.0000	RLA	5550.0000	0.0	N	P	NQ*
Chromium	80 - 120	25.4000		6.5000	B	22.2000	85.0		P	
Cobalt	80 - 120	47.1000		0.5400		55.5000	84.0		P	
Copper	80 - 120	27.4000		1.1000	J	27.7000	95.0		P	
Iron	80 - 120	1270.0000	N	1260.0000		111.0000	8.9	N	P	NQ*
Lead	80 - 120	45.5000		0.5400		55.5000	82.0		P	
Magnesium	80 - 120	16200.0000	N	11900.0000		5550.0000	77.0	N	P	JNJ
Manganese	80 - 120	99.5000		45.6000		55.5000	97.0		P	
Nickel	80 - 120	45.8000		0.4700	J	55.5000	82.0		P	
Potassium	80 - 120	5630.0000		175.0000		5550.0000	98.0		P	
Silver	75 - 120	3.2600	N	0.2200		5.5500	58.0	N	P	JNJ
Sodium	80 - 120	7190.0000		1940.0000		5550.0000	95.0		P	
Vanadium	80 - 120	53.5000		4.5000		55.5000	88.0		P	
Zinc	80 - 120	44.6000	N	1.7000	J	55.5000	77.0	N	P	JNJ

N Spike sample recovery is outside control limits.

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	___	[✓]	___

All but MSD OK-NQ

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

LMS/MSD & RPD's were calc

	YES	NO	N/A
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	✓	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

Job # GIB110556

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	✓	[___]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.	For QC blks - no impact		
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[✓]	___
is any RPD ≥ 100%?	___	[✓]	___

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**: Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[✓]	___
> ± 2xCRQL?	___	[✓]	___

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

YES NO N/A

and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

Soil/Sediment Field Duplicates

A.1.19.4 Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report) [✓] ___ ___

3SB02-0001-0211

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5x~~CRQL~~ LOD. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ ~~35%~~, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

30 soils

is any RPD ≥ ~~35%~~ but < 120%? ✓ [___] ___

is any RPD ≥ 120%? ___ [✓] ___

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-3SB02-0001-0211
Duplicate Sample ID: VEECA-3SB02P-0001-0211

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	14900	16000	7
arsenic	5.8	13.5	80
barium	12.3	13	6
beryllium	0.11	0.13	-0.02
calcium	179000	162000	10
chromium	30.1	31.3	4
cobalt	5.7	6.7	16
copper	11.7	13.3	13
iron	15400	16800	9
magnesium	5750	6310	9
manganese	149	149	0
nickel	8.9	10	12
potassium	4370	4500	3
selenium	0.29	0.57	-0.28
sodium	4500	4570	2
thallium	0.091	0.093	2
vanadium	43.3	49.2	13
zinc	16.9	18.8	11

COMMENTS: Qualifications were required-J As in both samples. Region II QC limits for flag -
gmg were used. gac

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL?	___	[✓]	___
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
A.1.20	**Laboratory Control Sample (LCS) - Form VII**			
A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples? site/client specific sample batched with this SDG	[✓]	✓	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	✓	[___]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples	For the submitted rinse blks - No impact		
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[___]	✓
	≥ 100%?	___	[___]	✓
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓
	ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.			
A.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓
	ACTION: If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.			
	If the Field Blank value is less than the			

		YES	NO	N/A
	Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1	Is verification report present for:			
	Method Detection Limits (Form IX-Annually)?	[✓]	___	___
	ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
	ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1	Are MDLs present on Form IX for:			
	All the analytes?	[✓]	___	___
	All the instruments used?	[✓]	___	___
	Digested and undigested samples and Calib.Blanks?	[✓]	___	___
	ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS? Dilutions were required	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

		YES	NO	N/A
	0.1 amu for each isotope in the tuning solution?	[✓]	___	___
	Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

A.1.26.1	Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
	Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

A.1.26.2	Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 per SAP of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
	If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	✓
	Was the %RI for the two fold diluted sample within the acceptance limits ~~(60-125%)~~ 30-120?	[___]	___	✓

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/10-2/11
Received Date: 2/12, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/25 soils, no prep. for waters
Analysis Dates: 2/25 soils, 2/12 for waters

All holding time requirements were met with the following exception. Sample VEECA-EB01-021111-SB exceeded the 24 hour holding time allowed for hexavalent chromium analysis. The reported non-detect result in this sample was qualified as estimated UJ.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level	Q Flag
no contamination requiring action was noted.				

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-2SB14-1H3H-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: VEECA-3SB02-0001-0211 Duplicate Sample ID: VEECA-3SB02P-0001-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD No positive results were reported for the the target analyte. Two samples were reported at elevated reporting limits due to observed matrix interferences. These results were flagged with a G flag by the laboratory. This flag was crossed out and the results were reported unqualified in the final DV report. Clarification of the calculations was requested from the laboratory.

Reviewer JA Cleveland **Date:** 4/25/11

Hexavalent Chromium Calcs - ICAL soils - 2/25/11

X - Response	Y - Concentration (mg/L)
0.001	0
0.005	0.005
0.009	0.01
0.022	0.025
0.042	0.05
0.082	0.1

slope, m (A1) =	1.232795153
y-int, (A0) =	-0.001413337
r =	0.999935359
Rr2=	0.999870723

VEECA-2SB14-1H3H-0211M: Lab Value - 1.32 mg/Kg
Response = 0.041

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0.049131265 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	7.95
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	5
% Solids Factor	0.937
Concentration =	1.319110637 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B120440, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B120440. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-5SD01-000H-0211	G1B120440-001	soil	X	X	X	X	X
VEECA-5SD02-000H-0211	G1B120440-002	soil	X	X	X	X	X
VEECA-5SD03-000H-0211	G1B120440-003	soil	X	X	X	X	X
VEECA-5SD04-000H-0211	G1B120440-004	soil	X	X	X	X	X
VEECA-5SD05-000H-0211	G1B120440-005	soil	X	X	X	X	X
VEECA-5SD06-000H-0211	G1B120440-006	soil	X	X	X	X	X
VEECA-5SD07-000H-0211	G1B120440-007	soil	X	X	X	X	X
VEECA-5SD08-000H-0211	G1B120440-008	soil	X	X	X	X	X
VEECA-5SD09-000H-0211	G1B120440-009	soil	X	X	X	X	X
VEECA-5SD10-000H-0211	G1B120440-010	soil	X	X	X	X	X
VEECA-5SD11-000H-0211	G1B120440-011	soil	X	X	X	X	X
VEECA-5SD012-000H-0211	G1B120440-012	soil	X	X	X	X	X
VEECA-5SD013-000H-0211	G1B120440-013	soil	X	X	X	X	X
VEECA-5SD14-000H-0211	G1B120440-014	soil	X	X	X	X	X
VEECA-5SD15-000H-0211	G1B120440-015	soil	X	X	X	X	X
VEECA-5SD11P-000H-0211	G1B120440-016	soil	X	X	X	X	X
VEECA-5SD02P-000H-0211	G1B120440-017	soil	X	X	X	X	X
VEECA-5SD05-000H-0211 MS	G1B120440-005MS	soil	X	X	X	X	X
VEECA-5SD05-000H-0211 MSD	G1B120440-005MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: sample VEECA-5SD11P-000H-0211-field duplicate of sample VEECA-5SD11-000H-0211 and sample VEECA-5SD02P-000H-0211-field duplicate of sample VEECA-5SD02-000H-0211. The samples were evaluated based on the following criteria:

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications were required to the data.

Perchlorate

No qualifications were required to the data.

Metals

The submitted MS/MSD pair exhibited non-compliant recoveries that resulted in qualification of the data.

One of the field duplicate pairs exhibited one non-compliant RPD. Qualifications were required in the field duplicate pair only.

Please note – calcium was flagged as RLA by the laboratory to indicate that the reporting limit was raised due to sample dilution. This qualifier was crossed out. No validation qualification was required.

Hexavalent Chromium

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/10/11 and samples were received at the laboratory on 2/12/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did

not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-5SD05-000H-0211	antimony	all soil samples	29/30	J/UJ	MSL

Field Duplicate

Metals

The field duplicate pair of samples VEECA-5SD11-000H-0211/ VEECA-5SD11-000H-0211exhibited one analytes with a high RPD (>30% per SAP). A summary of the non-compliant result and affected samples are noted in the following table. Qualifications were applied to the field duplicate pair only.

Field Dup Pair ID	Analyte	RPD	Qualifier	Q Code
VEECA-5SD11-000H-0211 VEECA-5SD11P-000H-0211	selenium	71	J	FD

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	antimony	+/-	J/UJ	MSL
VEECA-5SD11-000H-0211, VEECA-5SD11P-000H-0211	selenium	+	J	FD

Hexavalent Chromium

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
RF	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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B120440

CH2M Hill Inc

Client Sample ID: VEECA-5SD01-000H-0211

HPLC

Lot-Sample #...: G1B120440-001 Work Order #...: MEDMQ1AX Matrix.....: SOLID
Date Sampled...: 02/10/11 09:30 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 02:07
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(81 - 127)

WW 051111

005

CH2M Hill Inc

Client Sample ID: VEECA-5SD02-0008-0211

HPLC

Lot-Sample #...: G1B120440-002 Work Order #...: MEDMR1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:00 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 02:51
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-5SD03-000H-0211

HPLC

Lot-Sample #...: G1B120440-003 Work Order #...: MEDMT1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 11:05 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 03:33
Dilution Factor: 1

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

U11

CH2M Hill Inc

Client Sample ID: VEECA-5SD04-000H-0211

HPLC

Lot-Sample #...: G1B120440-004 Work Order #...: MEDMV1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 10:45 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 04:16
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 051111

U12

CH2M Hill Inc

Client Sample ID: VEECA-SSD05-000H-0211

HPLC

Lot-Sample #...: G1B120440-005 Work Order #...: MEDMW1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 13:20 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 04:59
Dilution Factor: 1
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

UM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-5SD06-000H-0211

HPLC

Lot-Sample #...: G1B120440-006 Work Order #...: MEDMX1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:05 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 07:08
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/1/11

U14

CH2M Hill Inc

Client Sample ID: VEECA-5SD07-000H-0211

HPLC

Lot-Sample #...: G1B120440-007 Work Order #...: MEDM01A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 07:52
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-5SD0B-000H-0211

HPLC

Lot-Sample #...: G1B120440-008 Work Order #...: MEDM11A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 15:00 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 09:17
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-5SD09-000H-0211

HPLC

Lot-Sample #...: G1B120440-009 Work Order #...: MEDM21A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 12:20 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 10:01
Dilution Factor: 1.01
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 051111

017

CH2M Hill Inc

Client Sample ID: VEECA-5SD10-000H-0211

HPLC

Lot-Sample #...: G1B120440-010 Work Order #...: MEDM31A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 10:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 10:44
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 05/11/11

U18

CH2M Hill Inc

Client Sample ID: VEECA-5SD11-000H-0211

HPLC

Lot-Sample #...: G1B120440-011 Work Order #...: MEDM41A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 11:27
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.6
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.8
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.2
2,6-Dinitrotoluene	29 U	240	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.8
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	59 U	490	ug/kg	15
PETN	59 U	490	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.8

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-5SD012-000H-0211

HPLC

Lot-Sample #...: G1B120440-012 Work Order #...: MEDM51AX Matrix.....: SOLID
Date Sampled...: 02/10/11 12:00 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 12:10
Dilution Factor: 1
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.8
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.3
2,6-Dinitrotoluene	30 U	250	ug/kg	7.3
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	60 U	500	ug/kg	15
PETN	60 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	93	(81 - 127)

D5/11/11

026

CH2M Hill Inc

Client Sample ID: VEECA-SSD013-000H-0211

HPLC

Lot-Sample #...: G1B120440-013 Work Order #...: MEDNF1A6 Matrix.....: SOLID
Date Sampled...: 02/10/11 16:00 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 12:52
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

021

CH2M Hill Inc

Client Sample ID: VEECA-SSD14-000H-0211

HPLC

Lot-Sample #...: G1B120440-014 Work Order #...: MEDNG1A6 Matrix.....: SOLID
Date Sampled...: 02/10/11 15:25 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 13:35
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

WM 051111

022

CH2M Hill Inc

Client Sample ID: VEECA-SSD15-000H-0211

HPLC

Lot-Sample #...: G1B120440-015 Work Order #...: MEDNH1A6 Matrix.....: SOLID
Date Sampled...: 02/10/11 15:35 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 14:18
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

LM 05/11/11

025

CH2M Hill Inc

Client Sample ID: VEECA-5SD11P-000H-0211

HPLC

Lot-Sample #...: G1B120440-016 Work Order #...: MEDNJ1AX Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 15:02
Dilution Factor: 1.01
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

WM 05/11/11

U24

CH2M Hill Inc

Client Sample ID: VEECA-5SD02P-000H-0211

HPLC

Lot-Sample #...: G1B120440-017 Work Order #...: MEDNM1A5 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:00 Date Received..: 02/12/11
Prep Date.....: 02/22/11 Analysis Date..: 02/25/11
Prep Batch #...: 1053391 Analysis Time..: 15:45
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

VM 05/11/11

U25

CH2M Hill Inc

Client Sample ID: VEECA-5SD01-000H-0211

HPLC

Lot-Sample #...:	G1B120440-001	Work Order #...:	MEDMQ1A6	Matrix.....:	SOLID
Date Sampled...:	02/10/11 09:30	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055264	Analysis Time..:	09:17		
Dilution Factor:	0.94				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.74 U	9.3	ug/kg	0.48

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

026

CH2M Hill Inc

Client Sample ID: VEECA-5SD02-000H-0211

HPLC

Lot-Sample #...:	G1B120440-002	**Work Order #...:**	MEDMR1A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 09:00	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	09:35		
Dilution Factor:	0.97				
		Method.....:	SW846 6850_DOD Ba		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.56 U	7.0	ug/kg	0.37

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

021

CH2M Hill Inc

Client Sample ID: VEECA-SSD03-000H-0211

HPLC

Lot-Sample #...:	G1B120440-003	**Work Order #...:**	MEDMT1A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 11:05	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	09:52		
Dilution Factor:	0.95				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.57 U	7.2	ug/kg	0.37

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

U26

CH2M Hill Inc

Client Sample ID: VEECA-5SD04-000H-0211

HPLC

Lot-Sample #...:	G1B120440-004	**Work Order #...:**	MEDMV1A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 10:45	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	10:10		
Dilution Factor:	0.92				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.50 U	6.3	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

025

CH2M Hill Inc

Client Sample ID: VEECA-5SD05-000H-0211

HPLC

Lot-Sample #...:	G1B120440-005	Work Order #...:	MEDMW1DT	Matrix.....:	SOLID
Date Sampled...:	02/10/11 13:20	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055264	Analysis Time..:	10:45		
Dilution Factor:	0.94				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.56 U	7.0	ug/kg	0.37

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

036

CH2M Hill Inc

Client Sample ID: VEECA-5SD06-000H-0211

HPLC

Lot-Sample #...:	G1B120440-006	Work Order #...:	MEDMX1A6	Matrix.....:	SOLID
Date Sampled...:	02/10/11 14:05	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055264	Analysis Time..:	11:37		
Dilution Factor:	0.98				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.55 U	6.9	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

LM 04/2011

031

CH2M Hill Inc

Client Sample ID: VEECA-SSD07-000H-0211

HPLC

Lot-Sample #...:	G1B120440-007	**Work Order #...:**	MEDM01A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 14:25	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	11:55		
Dilution Factor:	0.9				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.55 U	6.9	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

032

CH2M Hill Inc

Client Sample ID: VEECA-5SD08-000H-0211

HPLC

Lot-Sample #...:	G1B120440-008	**Work Order #...:**	MEDM11A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 15:00	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	12:13		
Dilution Factor:	0.9				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	**0.54 U**	**6.7**	ug/kg	0.35

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

LM 042111

CH2M Hill Inc

Client Sample ID: VEECA-5SD09-0008-0211

HPLC

Lot-Sample #...:	G1B120440-009	**Work Order #...:**	MEDM21A6	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 12:20	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	12:30		
Dilution Factor:	0.95				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.56 U	7.0	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

034

CH2M Hill Inc

Client Sample ID: VEECA-5SD10-000H-0211

HPLC

Lot-Sample #...: G1B120440-010 **Work Order #...:** MEDM31A6 **Matrix.....:** SOLID
Date Sampled...: 02/10/11 10:25 **Date Received..:** 02/12/11
Prep Date.....: 02/24/11 **Analysis Date..:** 02/27/11
Prep Batch #...: 1055264 **Analysis Time..:** 12:48
Dilution Factor: 0.96
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.56 U	7.0	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 04/21/11

036

CH2M Hill Inc

Client Sample ID: VEECA-5SD11-000H-0211

HPLC

Lot-Sample #...:	G1B120440-011	Work Order #...:	MEDM41A6	Matrix.....:	SOLID
Date Sampled...:	02/10/11 09:55	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055264	Analysis Time..:	13:23		
Dilution Factor:	0.91				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.50 U	6.3	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

036

CH2M Hill Inc

Client Sample ID: VEECA-5SD012-000B-0211

HPLC

Lot-Sample #...:	G1B120440-012	**Work Order #...:**	MEDM51A0	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 12:00	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	13:40		
Dilution Factor:	0.92				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.55 D	6.8	ug/kg	0.35

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

LM 042111

U37

CH2M Hill Inc

Client Sample ID: VEECA-5SD013-000H-0211

HPLC

Lot-Sample #...: G1B120440-013 Work Order #...: MEDNF1AH Matrix.....: SOLID
Date Sampled...: 02/10/11 16:00 Date Received..: 02/12/11
Prep Date.....: 02/24/11 Analysis Date..: 02/27/11
Prep Batch #...: 1055264 Analysis Time..: 13:58
Dilution Factor: 1.01
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.55 U	6.9	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

WM 042111

CH2M Hill Inc

Client Sample ID: VEECA-5SD14-000H-0211

HPLC

Lot-Sample #...:	G1B120440-014	**Work Order #...:**	MEDNG1AH	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 15:25	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	14:15		
Dilution Factor:	0.95				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.52 U	6.5	ug/kg	0.34

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

CH2M Hill Inc

Client Sample ID: VEECA-5SD15-000H-0211

HPLC

Lot-Sample #...: G1B120440-015 Work Order #...: MEDNH1AH Matrix.....: SOLID
Date Sampled...: 02/10/11 15:35 Date Received..: 02/12/11
Prep Date.....: 02/24/11 Analysis Date..: 02/27/11
Prep Batch #...: 1055264 Analysis Time..: 14:33
Dilution Factor: 0.95
Method.....: SW846 6850_DOD Ba

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.50 U	6.3	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

046

CH2M Hill Inc

Client Sample ID: VEECA-5SD11P-000H-0211

HPLC

Lot-Sample #...:	G1B120440-016	**Work Order #...:**	MEDNJ1A0	**Matrix.....:**	SOLID
Date Sampled...:	02/10/11 09:55	**Date Received..:**	02/12/11		
Prep Date.....:	02/24/11	**Analysis Date..:**	02/27/11		
Prep Batch #...:	1055264	**Analysis Time..:**	14:50		
Dilution Factor:	0.97				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	**0.51 U**	**6.3**	**ug/kg**	**0.33**

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 042111

141

CH2M Hill Inc

Client Sample ID: VEECA-5SD02P-000H-0211

HPLC

Lot-Sample #...:	G1B120440-017	Work Order #...:	MEDNM1AA	Matrix.....:	SOLID
Date Sampled...:	02/10/11 09:00	Date Received..:	02/12/11		
Prep Date.....:	02/24/11	Analysis Date..:	02/27/11		
Prep Batch #...:	1055264	Analysis Time..:	15:08		
Dilution Factor:	0.93				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.55 U	6.9	ug/kg	0.36

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 04/2/11

U42

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD01-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDMQ
Matrix:	SOIL	**Lab Sample ID:**	G1B120440001
% Solids:	50.0	**Date/Time Collected:**	02/10/11 9:30
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	17700.000			P
7440-36-0	Antimony	4.0000	~~U~~	W MSL	P
7440-38-2	Arsenic	3.3000	J		P
7440-39-3	Barium	29.6000			P
7440-41-7	Beryllium	0.0860	J		P
7440-43-9	Cadmium	0.1600	J		P
7440-70-2	Calcium	196000.00	~~B RLA~~		P
7440-47-3	Chromium	32.4000			P
7440-48-4	Cobalt	7.5000			P
7440-50-8	Copper	22.3000			P
7439-89-6	Iron	18200.000	~~B~~		P
7439-92-1	Lead	0.9900	U		P
7439-95-4	Magnesium	15800.000			P
7439-96-5	Manganese	418.0000			P
7440-02-0	Nickel	10.0000			P
7440-09-7	Potassium	6160.0000			P
7782-49-2	Selenium	2.0000	J		P
7440-22-4	Silver	0.4000	U		P
7440-23-5	Sodium	18800.000			P
7440-28-0	Thallium	0.2000	U		P
7440-62-2	Vanadium	51.6000			P
7440-66-6	Zinc	28.4000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JPC 4/25/11

045

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD02-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDMR
Matrix:	SOIL	**Lab Sample ID:**	G1B120440002
% Solids:	69.0	**Date/Time Collected:**	02/10/11 9:00
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16100.000			P
7440-36-0	Antimony	2.9000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.2000	U		P
7440-39-3	Barium	27.1000			P
7440-41-7	Beryllium	0.1400	U		P
7440-43-9	Cadmium	0.1400	U		P
7440-70-2	Calcium	246000.00	~~B RLA~~		P
7440-47-3	Chromium	28.4000			P
7440-48-4	Cobalt	5.2000			P
7440-50-8	Copper	11.2000			P
7439-89-6	Iron	13900.000	~~B~~		P
7439-92-1	Lead	0.7200	U		P
7439-95-4	Magnesium	14300.000			P
7439-96-5	Manganese	429.0000			P
7440-02-0	Nickel	7.5000			P
7440-09-7	Potassium	5630.0000			P
7782-49-2	Selenium	2.1000	J		P
7440-22-4	Silver	0.2900	U		P
7440-23-5	Sodium	4370.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	36.3000			P
7440-66-6	Zinc	19.4000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/25/11

044

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD03-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDMT
Matrix:	SOIL	**Lab Sample ID:**	G1B120440003
% Solids:	66.0	**Date/Time Collected:**	02/10/11 11:05
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15900.000			P
7440-36-0	Antimony	3.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.0000	J		P
7440-39-3	Barium	37.3000			P
7440-41-7	Beryllium	0.0660	J		P
7440-43-9	Cadmium	0.1500	U		P
7440-70-2	Calcium	208000.00	~~B RLA~~		P
7440-47-3	Chromium	29.0000			P
7440-48-4	Cobalt	6.8000			P
7440-50-8	Copper	17.0000			P
7439-89-6	Iron	15200.000	~~B~~		P
7439-92-1	Lead	0.7600	U		P
7439-95-4	Magnesium	16200.000			P
7439-96-5	Manganese	462.0000			P
7440-02-0	Nickel	8.9000			P
7440-09-7	Potassium	5480.0000			P
7782-49-2	Selenium	1.9000	J		P
7440-22-4	Silver	0.3000	U		P
7440-23-5	Sodium	5590.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	44.2000			P
7440-66-6	Zinc	22.2000			P

U Result is less than the reporting limit (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/25/11

U45

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD04-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDMV
Matrix:	SOIL	**Lab Sample ID:**	G1B120440004
% Solids:	73.0	**Date/Time Collected:**	02/10/11 10:45
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	9450.0000			P
7440-36-0	Antimony	2.7000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	26.1000			P
7440-41-7	Beryllium	0.1400	U		P
7440-43-9	Cadmium	0.0540	J		P
7440-70-2	Calcium	260000.00	~~B RLA~~		P
7440-47-3	Chromium	18.2000			P
7440-48-4	Cobalt	4.0000			P
7440-50-8	Copper	9.2000			P
7439-89-6	Iron	8680.0000	~~B~~		P
7439-92-1	Lead	3.4000	GU		P
7439-95-4	Magnesium	14000.000			P
7439-96-5	Manganese	355.0000			P
7440-02-0	Nickel	4.8000			P
7440-09-7	Potassium	3290.0000			P
7782-49-2	Selenium	0.7700	J		P
7440-22-4	Silver	0.2700	U		P
7440-23-5	Sodium	5290.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	27.0000			P
7440-66-6	Zinc	12.4000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

U46

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-5SD05-000H-0211
Lot Number:	G1B120440	Lab WorkOrder:	MEDMW
Matrix:	SOIL	Lab Sample ID:	G1B120440005
% Solids:	67.0	Date/Time Collected:	02/10/11 13:20
Units:	MG/KG	Date/Time Received:	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	20000.000			P
7440-36-0	Antimony	3.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	1.9000	J		P
7440-39-3	Barium	32.7000			P
7440-41-7	Beryllium	0.0900	J		P
7440-43-9	Cadmium	0.0580	J		P
7440-70-2	Calcium	246000.00	~~B RLA~~		P
7440-47-3	Chromium	35.5000			P
7440-48-4	Cobalt	7.9000			P
7440-50-8	Copper	17.6000			P
7439-89-6	Iron	17700.000	~~B~~		P
7439-92-1	Lead	0.7500	U		P
7439-95-4	Magnesium	17900.000			P
7439-96-5	Manganese	571.0000			P
7440-02-0	Nickel	10.4000			P
7440-09-7	Potassium	6450.0000			P
7782-49-2	Selenium	2.7000			P
7440-22-4	Silver	0.3000	U		P
7440-23-5	Sodium	5810.0000			P
7440-28-0	Thallium	0.0810	J		P
7440-62-2	Vanadium	53.4000			P
7440-66-6	Zinc	25.8000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 42511

U4'

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD06-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDMX
Matrix:	SOIL	**Lab Sample ID:**	G1B120440006
% Solids:	71.0	**Date/Time Collected:**	02/10/11 14:05
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	17100.000			P
7440-36-0	Antimony	2.8000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	1.6000	J		P
7440-39-3	Barium	30.3000			P
7440-41-7	Beryllium	0.0830	J		P
7440-43-9	Cadmium	0.0710	J		P
7440-70-2	Calcium	225000.00	~~B RLA~~		P
7440-47-3	Chromium	31.6000			P
7440-48-4	Cobalt	7.4000			P
7440-50-8	Copper	16.8000			P
7439-89-6	Iron	16400.000	~~B~~		P
7439-92-1	Lead	0.7000	U		P
7439-95-4	Magnesium	16800.000			P
7439-96-5	Manganese	538.0000			P
7440-02-0	Nickel	9.3000			P
7440-09-7	Potassium	5810.0000			P
7782-49-2	Selenium	2.3000			P
7440-22-4	Silver	0.2800	U		P
7440-23-5	Sodium	5030.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	48.4000			P
7440-66-6	Zinc	25.1000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

U46

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD07-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM0
Matrix:	SOIL	**Lab Sample ID:**	G1B120440007
% Solids:	66.0	**Date/Time Collected:**	02/10/11 14:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	17300.000			P
7440-36-0	Antimony	3.1000	~~U~~	UJ NSL	P
7440-38-2	Arsenic	1.7000	J		P
7440-39-3	Barium	31.2000			P
7440-41-7	Beryllium	0.0850	J		P
7440-43-9	Cadmium	0.0600	J		P
7440-70-2	Calcium	208000.00	~~B RLA~~		P
7440-47-3	Chromium	31.7000			P
7440-48-4	Cobalt	7.3000			P
7440-50-8	Copper	17.5000			P
7439-89-6	Iron	16500.000	~~B~~		P
7439-92-1	Lead	0.7600	U		P
7439-95-4	Magnesium	15800.000			P
7439-96-5	Manganese	482.0000			P
7440-02-0	Nickel	9.5000			P
7440-09-7	Potassium	5490.0000			P
7782-49-2	Selenium	2.1000	J		P
7440-22-4	Silver	0.3100	U		P
7440-23-5	Sodium	5770.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	47.8000			P
7440-66-6	Zinc	24.0000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JPC 4/25/11

U45

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSD08-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM1
Matrix:	SOIL	**Lab Sample ID:**	G1B120440008
% Solids:	67.0	**Date/Time Collected:**	02/10/11 15:00
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16700.000			P
7440-36-0	Antimony	3.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.4000	J		P
7440-39-3	Barium	34.3000			P
7440-41-7	Beryllium	0.0780	J		P
7440-43-9	Cadmium	0.0590	J		P
7440-70-2	Calcium	209000.00	~~B RLA~~		P
7440-47-3	Chromium	30.8000			P
7440-48-4	Cobalt	6.9000			P
7440-50-8	Copper	15.0000			P
7439-89-6	Iron	15700.000	~~B~~		P
7439-92-1	Lead	0.7500	U		P
7439-95-4	Magnesium	15000.000			P
7439-96-5	Manganese	496.0000			P
7440-02-0	Nickel	9.0000			P
7440-09-7	Potassium	5350.0000			P
7782-49-2	Selenium	0.7500	J		P
7440-22-4	Silver	0.3000	U		P
7440-23-5	Sodium	5860.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	47.0000			P
7440-66-6	Zinc	23.2000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

050

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSD09-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM2
Matrix:	SOIL	**Lab Sample ID:**	G1B120440009
% Solids:	68.0	**Date/Time Collected:**	02/10/11 12:20
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	19000.000			P
7440-36-0	Antimony	2.9000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.9000	J		P
7440-39-3	Barium	35.5000			P
7440-41-7	Beryllium	0.1100	J		P
7440-43-9	Cadmium	0.1600	J		P
7440-70-2	Calcium	209000.00	~~B RLA~~		P
7440-47-3	Chromium	34.3000			P
7440-48-4	Cobalt	8.3000			P
7440-50-8	Copper	25.9000			P
7439-89-6	Iron	17900.000	~~B~~		P
7439-92-1	Lead	0.7400	U		P
7439-95-4	Magnesium	17000.000			P
7439-96-5	Manganese	522.0000			P
7440-02-0	Nickel	10.8000			P
7440-09-7	Potassium	6490.0000			P
7782-49-2	Selenium	2.4000			P
7440-22-4	Silver	0.2900	U		P
7440-23-5	Sodium	6100.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	52.6000			P
7440-66-6	Zinc	27.2000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42571

U51

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSD10-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM3
Matrix:	SOIL	**Lab Sample ID:**	G1B120440010
% Solids:	69.0	**Date/Time Collected:**	02/10/11 10:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16600.000			P
7440-36-0	Antimony	2.9000	~~U~~	UJ NSL	P
7440-38-2	Arsenic	2.4000	J		P
7440-39-3	Barium	32.8000			P
7440-41-7	Beryllium	0.0800	J		P
7440-43-9	Cadmium	0.0840	J		P
7440-70-2	Calcium	211000.00	~~B~~ RLA		P
7440-47-3	Chromium	30.2000			P
7440-48-4	Cobalt	6.7000			P
7440-50-8	Copper	14.0000			P
7439-89-6	Iron	15500.000	~~B~~		P
7439-92-1	Lead	0.7300	U		P
7439-95-4	Magnesium	14300.000			P
7439-96-5	Manganese	454.0000			P
7440-02-0	Nickel	9.0000			P
7440-09-7	Potassium	5820.0000			P
7782-49-2	Selenium	1.9000	J		P
7440-22-4	Silver	0.2900	U		P
7440-23-5	Sodium	6290.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	40.5000			P
7440-66-6	Zinc	22.1000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 42511

052

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD11-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM4
Matrix:	SOIL	**Lab Sample ID:**	G1B120440011
% Solids:	73.0	**Date/Time Collected:**	02/10/11 9:55
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	10900.000			P
7440-36-0	Antimony	2.8000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.5000	J		P
7440-39-3	Barium	18.3000			P
7440-41-7	Beryllium	0.1400	U		P
7440-43-9	Cadmium	0.0680	J		P
7440-70-2	Calcium	250000.00	~~B RLA~~		P
7440-47-3	Chromium	22.5000			P
7440-48-4	Cobalt	4.0000			P
7440-50-8	Copper	12.0000			P
7439-89-6	Iron	9890.0000	~~B~~		P
7439-92-1	Lead	0.6900	U		P
7439-95-4	Magnesium	9030.0000			P
7439-96-5	Manganese	310.0000			P
7440-02-0	Nickel	5.9000			P
7440-09-7	Potassium	3480.0000			P
7782-49-2	Selenium	2.1000		J FD	P
7440-22-4	Silver	0.2800	U		P
7440-23-5	Sodium	4100.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	30.7000			P
7440-66-6	Zinc	14.2000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

055

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD012-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDM5
Matrix:	SOIL	**Lab Sample ID:**	G1B120440012
% Solids:	68.0	**Date/Time Collected:**	02/10/11 12:00
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	7180.0000			P
7440-36-0	Antimony	3.0000	~~U~~	UJ NSL	P
7440-38-2	Arsenic	1.7000	J		P
7440-39-3	Barium	16.2000			P
7440-41-7	Beryllium	0.1500	U		P
7440-43-9	Cadmium	0.0750	J		P
7440-70-2	Calcium	190000.00	~~B RLA~~		P
7440-47-3	Chromium	17.8000			P
7440-48-4	Cobalt	3.8000			P
7440-50-8	Copper	8.9000			P
7439-89-6	Iron	8180.0000	~~B~~		P
7439-92-1	Lead	0.7400	U		P
7439-95-4	Magnesium	8750.0000			P
7439-96-5	Manganese	274.0000			P
7440-02-0	Nickel	5.0000			P
7440-09-7	Potassium	2240.0000			P
7782-49-2	Selenium	1.6000	J		P
7440-22-4	Silver	0.3000	U		P
7440-23-5	Sodium	5020.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	29.9000			P
7440-66-6	Zinc	12.8000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JLC 4/25/11

054

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSD013-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDNF
Matrix:	SOIL	**Lab Sample ID:**	G1B120440013
% Solids:	73.0	**Date/Time Collected:**	02/10/11 16:00
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	7520.0000			P
7440-36-0	Antimony	2.7000	~~U~~	UJ MBL	P
7440-38-2	Arsenic	3.0000	J		P
7440-39-3	Barium	19.2000			P
7440-41-7	Beryllium	0.1400	U		P
7440-43-9	Cadmium	0.1500	J		P
7440-70-2	Calcium	213000.00	~~B RLA~~		P
7440-47-3	Chromium	17.7000			P
7440-48-4	Cobalt	5.1000			P
7440-50-8	Copper	12.0000			P
7439-89-6	Iron	10400.000	~~B~~		P
7439-92-1	Lead	0.6800	U		P
7439-95-4	Magnesium	9050.0000			P
7439-96-5	Manganese	340.0000			P
7440-02-0	Nickel	6.3000			P
7440-09-7	Potassium	1730.0000			P
7782-49-2	Selenium	0.8300	J		P
7440-22-4	Silver	0.2700	U		P
7440-23-5	Sodium	3350.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	43.5000			P
7440-66-6	Zinc	13.9000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JPC 12511

055

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-SSD14-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDNG
Matrix:	SOIL	**Lab Sample ID:**	G1B120440014
% Solids:	74.0	**Date/Time Collected:**	02/10/11 15:25
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	14300.000			P
7440-36-0	Antimony	2.7000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.1000	J		P
7440-39-3	Barium	48.4000			P
7440-41-7	Beryllium	0.0540	J		P
7440-43-9	Cadmium	0.0530	J		P
7440-70-2	Calcium	205000.00	~~B RLA~~		P
7440-47-3	Chromium	27.0000			P
7440-48-4	Cobalt	7.0000			P
7440-50-8	Copper	12.8000			P
7439-89-6	Iron	15700.000	~~B~~		P
7439-92-1	Lead	0.6800	U		P
7439-95-4	Magnesium	13800.000			P
7439-96-5	Manganese	498.0000			P
7440-02-0	Nickel	8.6000			P
7440-09-7	Potassium	4370.0000			P
7782-49-2	Selenium	2.3000			P
7440-22-4	Silver	0.2700	U		P
7440-23-5	Sodium	4730.0000			P
7440-28-0	Thallium	0.1400	U		P
7440-62-2	Vanadium	47.9000			P
7440-66-6	Zinc	18.8000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

qac 4/25/11

656

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD15-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDNH
Matrix:	SOIL	**Lab Sample ID:**	G1B120440015
% Solids:	76.0	**Date/Time Collected:**	02/10/11 15:35
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	10900.000			P
7440-36-0	Antimony	2.6000	~~B~~	UJ MSL	P
7440-38-2	Arsenic	2.4000	J		P
7440-39-3	Barium	33.4000			P
7440-41-7	Beryllium	0.0560	J		P
7440-43-9	Cadmium	0.0660	J		P
7440-70-2	Calcium	163000.00	~~B RLA~~		P
7440-47-3	Chromium	28.4000			P
7440-48-4	Cobalt	7.8000			P
7440-50-8	Copper	15.3000			P
7439-89-6	Iron	15900.000	~~B~~		P
7439-92-1	Lead	0.6600	U		P
7439-95-4	Magnesium	9460.0000			P
7439-96-5	Manganese	390.0000			P
7440-02-0	Nickel	9.3000			P
7440-09-7	Potassium	1870.0000			P
7782-49-2	Selenium	1.0000	J		P
7440-22-4	Silver	0.2600	U		P
7440-23-5	Sodium	3030.0000			P
7440-28-0	Thallium	0.1300	U		P
7440-62-2	Vanadium	62.3000			P
7440-66-6	Zinc	21.9000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

057

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD11P-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDNJ
Matrix:	SOIL	**Lab Sample ID:**	G1B120440016
% Solids:	77.0	**Date/Time Collected:**	02/10/11 9:55
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	10000.000			P
7440-36-0	Antimony	2.6000	~~U~~	UJ MS	P
7440-38-2	Arsenic	2.3000	J		P
7440-39-3	Barium	18.3000			P
7440-41-7	Beryllium	0.1300	U		P
7440-43-9	Cadmium	0.0630	J		P
7440-70-2	Calcium	227000.00	~~B RLA~~		P
7440-47-3	Chromium	21.4000			P
7440-48-4	Cobalt	4.6000			P
7440-50-8	Copper	10.3000			P
7439-89-6	Iron	9970.0000	~~B~~		P
7439-92-1	Lead	0.6500	U		P
7439-95-4	Magnesium	9170.0000			P
7439-96-5	Manganese	324.0000			P
7440-02-0	Nickel	5.8000			P
7440-09-7	Potassium	3080.0000			P
7782-49-2	Selenium	1.0000	~~J~~	J FD	P
7440-22-4	Silver	0.2600	U		P
7440-23-5	Sodium	3670.0000			P
7440-28-0	Thallium	0.1300	U		P
7440-62-2	Vanadium	32.7000			P
7440-66-6	Zinc	13.5000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

658

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-5SD02P-000H-0211
Lot Number:	G1B120440	**Lab WorkOrder:**	MEDNM
Matrix:	SOIL	**Lab Sample ID:**	G1B120440017
% Solids:	67.0	**Date/Time Collected:**	02/10/11 9:00
Units:	MG/KG	**Date/Time Received:**	02/12/11 11:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	13700.000			P
7440-36-0	Antimony	3.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.2000	U		P
7440-39-3	Barium	29.2000			P
7440-41-7	Beryllium	0.1500	U		P
7440-43-9	Cadmium	0.0460	J		P
7440-70-2	Calcium	235000.00	~~B RLA~~		P
7440-47-3	Chromium	25.3000			P
7440-48-4	Cobalt	5.4000			P
7440-50-8	Copper	12.6000			P
7439-89-6	Iron	12700.000	~~B~~		P
7439-92-1	Lead	0.7400	U		P
7439-95-4	Magnesium	14500.000			P
7439-96-5	Manganese	392.0000			P
7440-02-0	Nickel	7.2000			P
7440-09-7	Potassium	4840.0000			P
7782-49-2	Selenium	2.2000			P
7440-22-4	Silver	0.3000	U		P
7440-23-5	Sodium	4510.0000			P
7440-28-0	Thallium	0.1500	U		P
7440-62-2	Vanadium	35.5000			P
7440-66-6	Zinc	18.9000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 42511

055

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-5SD01-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-001 Work Order #...: MEDMQ Matrix.....: SOLID
Date Sampled...: 02/10/11 09:30 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	15.9	0.20	—	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:31	DL.....: 0.20	
Hexavalent Chromium	0.050 U	0.099	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:23	DL.....: 0.020	
Percent Moisture	49.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JJC 4/26/11

666

CH2M Hill Inc

Client Sample ID: VEECA-SSD02-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-002 Work Order #...: MEDMR Matrix.....: SOLID
Date Sampled...: 02/10/11 09:00 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.1	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:35	DL.....: 0.14	
Hexavalent Chromium	0.036 U	0.072	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.014	
Percent Moisture	30.9	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054362
		Dilution Factor: 1		Analysis Time..: 08:57	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

061

CH2M Hill Inc

Client Sample ID: VEECA-SSD03-000R-0211

General Chemistry

Lot-Sample #...: G1B120440-003 Work Order #...: MEDMT Matrix.....: SOLID
Date Sampled...: 02/10/11 11:05 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.6	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:39	DL.....: 0.15	
Hexavalent Chromium	0.038 U	0.076	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.015	
Percent Moisture	33.8	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:51	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

662

CH2M Hill Inc

Client Sample ID: VEECA-5SD04-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-004 Work Order #...: MEDMV Matrix.....: SOLID
Date Sampled...: 02/10/11 10:45 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.3	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:43	DL.....: 0.14	
Hexavalent Chromium	0.034 U	0.068	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.014	
Percent Moisture	26.7	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:51	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JPC 4/26/11

66

CH2M Hill Inc

Client Sample ID: VEECA-5SD05-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-005 Work Order #...: MEDMW Matrix.....: SOLID
Date Sampled...: 02/10/11 13:20 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.5	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:48	DL.....: 0.15	
Hexavalent Chromium	0.037 U	0.075	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.015	
Percent Moisture	33.1	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:51	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

664

CH2M Hill Inc

Client Sample ID: VEECA-5SD06-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-006 Work Order #...: MEDMX Matrix.....: SOLID
Date Sampled...: 02/10/11 14:05 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.8	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 13:56	DL.....: 0.14	
Hexavalent Chromium	0.035 U	0.070	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:26	DL.....: 0.014	
Percent Moisture	29.0	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:51	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JPC 4/26/11

CH2M Hill Inc

Client Sample ID: VEECA-5SD07-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-007 Work Order #...: MEDM0 Matrix.....: SOLID
Date Sampled...: 02/10/11 14:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.7	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:00	DL.....: 0.15	
Hexavalent Chromium	0.038 U	0.076	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:27	DL.....: 0.015	
Percent Moisture	34.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JPC 4/26/11

666

CH2M Hill Inc

Client Sample ID: VEECA-5SD08-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-008 **Work Order #...:** MEDM1 **Matrix.....:** SOLID
Date Sampled...: 02/10/11 15:00 **Date Received..:** 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.4	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:04	DL.....: 0.15	
Hexavalent Chromium	0.037 U	0.075	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:28	DL.....: 0.015	
Percent Moisture	33.1	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

CH2M Hill Inc

Client Sample ID: VEECA-5SD09-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-009 Work Order #...: MEDM2 Matrix.....: SOLID
Date Sampled...: 02/10/11 12:20 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.3	0.15	—	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:08	DL.....: 0.15	
Hexavalent Chromium	0.037 U	0.074	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:28	DL.....: 0.015	
Percent Moisture	32.2	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

066

CH2M Hill Inc

Client Sample ID: VEECA-SSD10-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-010 Work Order #...: MEDM3 Matrix.....: SOLID
Date Sampled...: 02/10/11 10:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.9	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:16	DL.....: 0.15	
Hexavalent Chromium	0.036 U	0.073	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:29	DL.....: 0.015	
Percent Moisture	31.1	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JBC 4/26/11

665

CH2M Hill Inc

Client Sample ID: VEECA-5SD11-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-011 Work Order #...: MEDM4 Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.6	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:20	DL.....: 0.14	
Hexavalent Chromium	0.034 U	0.069	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:29	DL.....: 0.014	
Percent Moisture	27.4	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JMC 4-20-11

CH2M Hill Inc

Client Sample ID: VEECA-SSD012-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-012 Work Order #...: MEDM5 Matrix.....: SOLID
Date Sampled...: 02/10/11 12:00 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.1	0.15	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.15	
Hexavalent Chromium	0.037 U	0.074	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:30	DL.....: 0.015	
Percent Moisture	32.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:52	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

U7

CH2M Hill Inc

Client Sample ID: VEECA-SSD013-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-013 Work Order #...: MEDNF Matrix.....: SOLID
Date Sampled...: 02/10/11 16:00 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.1	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:28	DL.....: 0.14	
Hexavalent Chromium	0.034 U	0.068	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:30	DL.....: 0.014	
Percent Moisture	26.7	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

072

CH2M Hill Inc

Client Sample ID: VEECA-SSD14-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-014 Work Order #...: MEDNG Matrix.....: SOLID
Date Sampled...: 02/10/11 15:25 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	11.4	0.14	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:33	DL.....: 0.14	
Hexavalent Chromium	0.019 J	0.068	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:31	DL.....: 0.014	
Percent Moisture	26.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

JLC 4/26/11

075

CH2M Hill Inc

Client Sample ID: VEECA-5SD15-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-015 Work Order #...: MEDNH Matrix.....: SOLID
Date Sampled...: 02/10/11 15:35 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	10.8	0.13	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:37	DL.....: 0.13	
Hexavalent Chromium	0.019 J	0.066	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:31	DL.....: 0.013	
Percent Moisture	24.4	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than RL.

JLC 4/20/11

074

CH2M Hill Inc

Client Sample ID: VEECA-5SD11P-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-016 Work Order #...: MEDNJ Matrix.....: SOLID
Date Sampled...: 02/10/11 09:55 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	10.9	0.13	--	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:41	DL.....: 0.13	
Hexavalent Chromium	0.033 U	0.065	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:32	DL.....: 0.013	
Percent Moisture	23.5	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

675

CH2M Hill Inc

Client Sample ID: VEECA-SSD02P-000H-0211

General Chemistry

Lot-Sample #...: G1B120440-017 Work Order #...: MEDNM Matrix.....: SOLID
Date Sampled...: 02/10/11 09:00 Date Received..: 02/12/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	12.4	0.15	—	SW846 9045C	02/28/11	1057088
		Dilution Factor: 1		Analysis Time..: 14:45	DL.....: 0.15	
Hexavalent Chromium	0.037 U	0.074	mg/kg	SW846 7196A	02/28/11	1057086
		Dilution Factor: 1		Analysis Time..: 14:33	DL.....: 0.015	
Percent Moisture	32.6	0.10	%	ASTM D 2216-90	02/23-02/25/11	1054363
		Dilution Factor: 1		Analysis Time..: 08:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

6/6

Case Narrative

TestAmerica West Sacramento Project Number G1B120440

General Comments

These samples and the associated temperature blank were received at 0 degree Celsius (C) with wet ice used as the cooling agent.

No sample date was listed on chain of custody (COC). The client advised that a collection date of February 10, 2011 be used. Also the client advised that the client IDs for all samples be changed from VEECA-XXXX-**00H**-0211 to VEECA-XXXX-**000H**-0211.

The client also advised that the collection time be changed for the following samples:
VEECA-5SD07-000H-0211 from 10:15 to 14:25
VEECA-5SD08-000H-0211 from 10:30 to 15:00
VEECA-5SD09-000H-0211 from 12:30 to 12:20
VEECA-5SD10-000H-0211 from 11:30 to 10:25

Per client request there were some additional client IDs that were modified from that indicated on the COC:
VEECA-5SD011-00H-0211 was changed to VEECA-5SD11-000H-0211
VEECA-5SD012-00H-0211 was changed to VEECA-5SD12-000H-0211
VEECA-5SD013-00H-0211 was changed to VEECA-5SD13-000H-0211
VEECA-5SD014-00H-0211 was changed to VEECA-5SD14-000H-0211
VEECA-5SD015-00H-0211 was changed to VEECA-5SD15-000H-0211
VEECA-5SD011P-00H-0211 was changed to VEECA-5SD11P-000H-0211

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

The samples for grain size analysis were shipped to TestAmerica Seattle facility on February 14, 2011.

Case Narrative

TestAmerica West Sacramento Project Number G1B120440

SOLID, 6850/DOD Handbook, Perchlorate

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:

LCS: METF31AC

SMCS: METF31AD

✓ **SOLID, 6010B, Metals**

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

The recoveries for aluminum, antimony, calcium, iron, and manganese are outside the established control limits for the matrix spike/matrix spike duplicate (MS/MSD) associated with this batch. The concentrations of aluminum, calcium, iron, and manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

✓ The method blank (MB) associated with this extraction batch has calcium and iron detected. The concentration of iron was detected below one half the reporting limit. The concentration of calcium detected was greater than one half the reporting limit but all the sample results associated with this MB were 10X higher than the MB therefore there is little impact on the data.

There are no other anomalies associated with this project.

078

Sample Summary

TestAmerica West Sacramento Project Number G1B120440

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEDMQ	1	VEECA-5SD01-000H-0211	2/10/2011 09:30 AM	2/12/2011 11:00 AM
MEDMR	2	VEECA-5SD02-000H-0211	2/10/2011 09:00 AM	2/12/2011 11:00 AM
MEDMT	3	VEECA-5SD03-000H-0211	2/10/2011 11:05 AM	2/12/2011 11:00 AM
MEDMV	4	VEECA-5SD04-000H-0211	2/10/2011 10:45 AM	2/12/2011 11:00 AM
MEDMW	5	VEECA-5SD05-000H-0211	2/10/2011 01:20 PM	2/12/2011 11:00 AM
MEDMX	6	VEECA-5SD06-000H-0211	2/10/2011 02:05 PM	2/12/2011 11:00 AM
MEDM0	7	VEECA-5SD07-000H-0211	2/10/2011 02:25 PM	2/12/2011 11:00 AM
MEDM1	8	VEECA-5SD08-000H-0211	2/10/2011 03:00 PM	2/12/2011 11:00 AM
MEDM2	9	VEECA-5SD09-000H-0211	2/10/2011 12:20 PM	2/12/2011 11:00 AM
MEDM3	10	VEECA-5SD10-000H-0211	2/10/2011 10:25 AM	2/12/2011 11:00 AM
MEDM4	11	VEECA-5SD11-000H-0211	2/10/2011 09:55 AM	2/12/2011 11:00 AM
MEDM5	12	VEECA-5SD012-000H-0211	2/10/2011 12:00 PM	2/12/2011 11:00 AM
MEDNF	13	VEECA-5SD013-000H-0211	2/10/2011 04:00 PM	2/12/2011 11:00 AM
MEDNG	14	VEECA-5SD14-000H-0211	2/10/2011 03:25 PM	2/12/2011 11:00 AM
MEDNH	15	VEECA-5SD15-000H-0211	2/10/2011 03:35 PM	2/12/2011 11:00 AM
MEDNJ	16	VEECA-5SD11P-000H-0211	2/10/2011 09:55 AM	2/12/2011 11:00 AM
MEDNM	17	VEECA-5SD02P-000H-0211	2/10/2011 09:00 AM	2/12/2011 11:00 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

075

G1B120440

G1B120440 № 02396

Page 1 of 2

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Company Name: CH2M Hill	Project Name: ECA Sampling
Address: 5700 Cleveland St, Suite 101	Sampling Location: Vieques, PR
City: Virginia Beach State: VA Zip: 23462	Turnaround time
Project Contact: Michael Zamboni	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #: michael.zamboni@ch2m.com	Are aqueous samples field filtered for metals? Y or N
Sampler's Name: J. Martin	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Explo/Ex/HEM/Metals/Hg	Grain size
1	VEECA-SS001-00H-0211		0930		2							✓	✓
2	VEECA-SS002-00H-0211		0900		2							✓	✓
3	VEECA-SS003-00H-0211		1105		2							✓	✓
4	VEECA-SS004-00H-0211		1045		2							✓	✓
5	VEECA-SS005-00H-0211		1320		4							✓	✓
6	VEECA-SS006-00H-0211		1405		2							✓	✓
7	VEECA-SS007-00H-0211		1015		2							✓	✓
8	VEECA-SS008-00H-0211		1030		2							✓	✓
9	VEECA-SS009-00H-0211		1230		2							✓	✓
10	VEECA-SS010-00H-0211		1130		2							✓	✓

Sample Unpacked By:
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

Run MS/MSD SS005

Relinquished by:	Date/Time: 2/16/11 1200	Received by:	Date/Time: 2-17-11 1145
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: °C

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

White & Yellow copy to lab • Pink copy for customer

G1B120440

G1B 120440 № 02397

Page 2 of 2

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Company Name	Project Name
Address	Sampling Location
City State Zip	Turnaround time
Project Contact	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #	Are aqueous samples field filtered for metals? Y or N
Sampler's Name	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	EXPIO/LXHEN /Metal Hg	Grain size
11	UEECA-SSD011-00H-02U		0955		2							✓	✓
12	UEECA-SSD012-00H-02U		1200		2							✓	✓
13	UEECA-SSD013-00H-02U		1600		2							✓	✓
14	UEECA-SSD014-00H-02U		1525		2							✓	✓
15	UEECA-SSD015-00H-02U		1535		2							✓	✓
16	UEECA-SSD011P-00H-02U		0955		1							✓	
17	UEECA-SSD02P-00H-02U		0900		1							✓	

Sample Unpacked By:	Cyanide samples checked for sulfide & chlorine? Y or NA	
Sample Order Entry By:	625 & Phenol samples checked for chlorine? Y or NA	
Samples Received in Good Condition? Y or N	608 samples checked for pH between 5.0-9.0? Y or NA	
If no, explain:		

Relinquished by:	Date/Time: 2/16/11 1200	Received by:	Date/Time: 2-12-11 1145
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: °C

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

White & Yellow copy to lab • Pink copy for customer

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2MHill PM KS LOG # 09344

LOT# (QUANTIMS ID) G1B120440 QUOTE# 88113 LOCATION 11/0C

Checked (✓)

DATE RECEIVED 2-12-11 TIME RECEIVED 1100 ☐

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C) see temp. sheet

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials: AL Date: 2-12-11

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH ☑ N/A ☑
APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: AL Date: 2-12-11

Notes Sampled 2-9-11 - NO Collection Date on COC
no bubble wrap between jars.
All labeled -OUH-, COC lists -OUH-

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M+Hill LOT# (QUANTIMS ID): G1B120440

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600161, 600162 ☑

COC #(S) 2396, 2397

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 0 0 AVERAGE: 0 CORRECTED 0 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600164, 600163 ☑

COC #(S) 2396, 2397

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 0 0 AVERAGE: 0 CORRECTED 0 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

COOLER ID ☐

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☐

CUSTODY SEAL #(S) ☐

COC #(S)

TEMPERATURE BLANK: OBSERVED: CORRECTED ☐

SAMPLE TEMPERATURE:

OBSERVED: AVERAGE: CORRECTED ☐

SAMPLES / TESTS (IF NCM REQUIRED): ☐

LABORATORY THERMOMETER ID:

IR UNIT: #4☐ #5☐ ☐ OTHER ☐

UP 2-12-16

Initials Date

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B120440

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
250AGJ	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1			
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

G1B120440

G1B120440 № 02396

Page 1 of 2

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Company Name: CH2M Hill
Address: 5700 Cleveland St, Suite 101
City: Virginia Beach State: VA Zip: 23462
Project Contact: Michael Zamboni
Phone #: michael.zamboni@ch2m.com
Sampler's Name: J. Martin

Project Name: ECA Sampling
Sampling Location: Vieques, PR
Turnaround time:
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)?

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

	Field ID (55D → 000H)	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	Explo/nxHEM/MeOH2O	Grain size
1	VEECA-SS001-000H-0211	2/10	0930		2							✓	✓
2	VEECA-SS002-000H-0211		0900		2							✓	✓
3	VEECA-SS003-000H-0211		1105		2							✓	✓
4	VEECA-SS004-000H-0211		1045		2							✓	✓
5	VEECA-SS005-000H-0211		1320		4							✓	✓
6	VEECA-SS006-000H-0211		1405		2							✓	✓
7	VEECA-SS007-000H-0211		~~1015~~	14 25	2							✓	✓
8	VEECA-SS008-000H-0211		~~1030~~	15 00	2							✓	✓
9	VEECA-SS009-000H-0211		~~1250~~	12 20	2							✓	✓
0	VEECA-SS010-000H-0211	✓	~~1130~~	10 25	2							✓	✓

Sample Unpacked By:
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

Run MS/MSD SS005

Relinquished by: Date/Time: 2/11/11 1200 Received by: Date/Time: 2-12-11 1145
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: °C

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

White & Yellow copy to lab • Pink copy for customer

Sacramento (916) 373-5600

G1B120440

G1B 120440 № 02397

Page 2 of 2

CompuChem
a division of Liberty Analytical Corp.

CHAIN OF CUSTODY

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

Courier
Airbill No.
Sampling Complete? Y or N

Company Name	Project Name
Address	Sampling Location
City State Zip	Turnaround time
Project Contact	Batch QC or Project Specific? If Specific, which Sample ID?
Phone #	Are aqueous samples field filtered for metals? Y or N
Sampler's Name	Are high concentrations expected? Y or N? If yes, which ID(s)?

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

	Field ID	Collection Date	Collection Time	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	MEOH	Other	EXPIO/LXHEM/Metal Hg	Grain size
11	VEECA-55D11-00H-0211	2/10	0955		2							✓	✓
12	VEECA-55D12-00H-0211		1200		2							✓	✓
13	VEECA-55D13-00H-0211		1600		2							✓	✓
14	VEECA-55D14-00H-0211		1525		2							✓	✓
15	VEECA-55D15-00H-0211		1535		2							✓	✓
16	VEECA-55D11P-00H-0211		0955		1							✓	
17	VEECA-55D029-00H-0211		0900		1							✓	

Sacramento (916) 373-5800

Lab Use Only

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

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

Comments

Sample Custody

Relinquished by:	Date/Time: 2/11/11 1200	Received by:	Date/Time: 2-12-11 1145
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: °C

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

White & Yellow copy to lab • Pink copy for customer

MEMORANDUM **CH2MHILL**

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: March 4, 2011

This memo is to document corrections made to the Chains of Custody (COC) and laboratory log-ins for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

~~G1B120440~~
G1C040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-5SD01-000H-0211	TOC – Lloyd Kohn	2/10/2011	09:30
VEECA-5SD02-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:00
VEECA-5SD03-000H-0211	TOC – Lloyd Kohn	2/10/2011	11:05
VEECA-5SD04-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:45
VEECA-5SD05-000H-0211	TOC – Lloyd Kohn	2/9/2011	13:20
VEECA-5SD06-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:05
VEECA-5SD07-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:25
VEECA-5SD08-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:00
VEECA-5SD09-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:20
VEECA-5SD10-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:25
VEECA-5SD11-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:55
VEECA-5SD12-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:00
VEECA-5SD13-000H-0211	TOC – Lloyd Kohn	2/10/2011	16:00
VEECA-5SD14-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:25
VEECA-5SD15-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:35

The following samples need updated sample IDs, dates, and/or times:

G1B100573-5
G1B120440 + C040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-EB01-020911-SW	2/9/2011	07:00	MEAFV
VEECA-5SD01-000H-0211	2/10/11	09:30	MEDMQ
VEECA-5SD02-000H-0211	2/10/11	09:00	MEDMR
VEECA-5SD02P-000H-0211	2/10/11	09:00	MEDNM

17

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

G1B120440 +
J1C040608

	VEECA-5SD03-000H-0211	2/10/11	11:05	MEDMT	
	VEECA-5SD04-000H-0211	2/10/11	10:45	MEDMV	
	VEECA-5SD05-000H-0211	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-MS	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-SD	2/10/11	13:20	MEDMW	
	VEECA-5SD06-000H-0211	2/10/11	14:05 ok	MEDMX	
	VEECA-5SD07-000H-0211	2/10/11	14:25 (10:15)	MEDM0	
	VEECA-5SD08-000H-0211	2/10/11	15:00 (10:30)	MEDM1	
	VEECA-5SD09-000H-0211	2/10/11	12:20 (12:30)	MEDM2	
	VEECA-5SD10-000H-0211	2/10/11	10:25 (11:30)	MEDM3	
	VEECA-5SD11-000H-0211	2/10/11	09:55	MEDM4	
	VEECA-5SD11P-000H-0211	2/10/11	09:55	MEDNJ	7/16
	VEECA-5SD12-000H-0211	2/10/11	12:00	MEDM5	
	VEECA-5SD13-000H-0211	2/10/11	16:00	MEDNF	
	VEECA-5SD14-000H-0211	2/10/11	15:25	MEDNG	
	VEECA-5SD15-000H-0211	2/10/11	15:35	MEDNH	
G1B100573 - 2	VEECA-5SW02-0211	2/9/11	10:10	MEAFQ	✓
- 6	VEECA-5SW04-0211	2/9/11	11:35	MEAFW	✓
	VEECA-5SW04-0211-MS	2/9/11	11:35	MEAFW	✓
- 5	VEECA-EB01-020911-SW	2/9/11	07:00	MEAFV	✓
G1B190434 - 4	VEECA-6SMI05-0211	2/17/11	15:00	MEMJR	✓
G1B230594 - 1	VEECA-4SB01-001H-0211 *	2/18/11	08:30	MEQ97	✓
G1B040475 - 2	VEECA-4SMI02-0211 ✓	2/2/11 ✓	11:00 ✓	MD3CL	✓

* from VEECA-4SB01-TTBB-0211

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B120440

LAB: Test America- West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/10/11 Prep 2/22/11

8.0 Holding Times Recd 2/12/11 Analy 2/25/11

8.1 Have any nitroaromatics and nitroamines technical

 Temp 0°C 191

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? Listed on Form 1

a. Water/Waste [ ] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? Listed on Form 1

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just std dev and value [ ] ___ ✓

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ [✓]

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

056

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [✓] ___ ___

US

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Soil
0 out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

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

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

VEECA-EB01-021011-SW

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) ✓ ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples ✓ ___ ___

b. All blanks ✓ ___ ___

c. Matrix spike samples ✓ ___ ___

d. 5 pt. initial calibration standards ✓ ___ ___

e. Calibration verification standards ✓ ___ ___

f. Laboratory Control samples (LCS) ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? ✓ ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [4] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] [✓] ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [4] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [4] ___ ___

w/in 1 min

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [U] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? see below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked CCal in sequence and compared RT and checked stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) [✓] ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines)

Run Log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? [✓] ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [ ] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns. N/A

106

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement, the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? ☑ ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ ☑ ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. ☑ ___ ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

VEECA-SSD11-000H-0211
VEECA-SSD11P-000H-0211 } no ⊕

VEECA-SSD02-000H-0211
VEECA-SSD02P-000H-0211 } no ⊕

Field Triplicate → none for this data pkg.

Initial Calibration Date: 1/8/2011

RCF and %RSD Calculations:

Compound Name: 4-AM-2,6-DNT, level 5
Lab Value: 79.8500

Height of Compound	7985
Conc. of Compound	100
Calculated CF	79.850

Compound Name: nitrobenzene
Lab Value: 8.6

CF of STD 1	81.40
CF of STD 2	86.30
CF of STD 3	79.30
CF of STD 4	82.02
CF of STD 5	77.79
CF of STD 6	80.00
CF of STD 7	73.33
CF of STD 8	64.21
Calculated % RSD	8.6

Continuing Calibration File ID: 2/25/11, 8:34

RCF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	9156
Conc. of Compound	100
Calculated CF	91.560

Compound Name: tertyl
Lab Value: 8

Average CF	100.000
CF of CCV	91.560
Calculated % D	8.4

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27	MD 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN

COLUMN PHASE: Zorbax CN

COLUMN SN: USJT010289

METHOD ID: 8330

DIMENSIONS: 250 x 4.6mm 5u

MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	

19
20
21
22
23 For all lots analyzed on LC12.
24
25
26
27
28 MW 5/6/11
29
30
31

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/10/11
Received Date: 2/12/11
Prep Date: 2/24/11
Analysis Dates: 2/27/11
Cooler Temp: 0°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

No contamination was noted in the method and/or grinding blanks – no qualifications required. Associated QC blanks were: VEECA-EB01-020911-SD and VEECA-EB01-021011-SW (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for sample VEECA-5SD05-000H-0211—all criteria were met.

Field Duplicate Sample

A field duplicate was submitted for samples VEECA-5SD02-000H-0211 and VEECA-5SD11-000H-0211—no positive results, no qualifications.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer _____ **Date:** 4/21/11

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[___]	___	✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	✓	✓
RAS/Non-RAS Case No.?	[___]	✓	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]	✓	

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

Values present - not validated

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[ ]		✓
Cyanide?	[ ]		✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?		[ ]	✓
Mercury analysis(28 days) exceeded?		[ ]	✓
Other Metals analysis(180 days)exceeded?	✓	[ ]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:			
Metals Analysis ≤ 2?	[✓]		
Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the ~~CRQLs~~ LOD's and coded with "U"?	[✓]	___	___
Are values less than the ~~CRQLs~~ LOD's but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B050467

ICP - AES	
SAMPLE ID	VEECA-5SD01-000H-0211
ANALYTE	Copper
Lab Value CONCENTRATION (mg/Kg)	22.3
AMOUNT FROM RAW DATA (ug/ml)	0.11392
SAMPLE SIZE (g)	1.01
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.5
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	22.558

ICP-MS	
SAMPLE ID	VEECA-5SD07-000H-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	1.7
AMOUNT FROM RAW DATA (ug/L)	2.21987
SAMPLE SIZE (g)	1.02
FINAL VOLUME (L)	0.1
DILUTION FACTOR	5
DRYNESS FACTOR	0.655
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	1.66133

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓*]	___	___

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were required but no note was on the Form I's

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]	___	✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]	___	✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient ≥ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES (more than 2 point Calib.)?	[___]	___	✓
	ICP-MS (more than 2 point calib.)?	[✓]	___	___
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".			
	NOTE: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]	___	___
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R? no quals required	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B120440 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110222B2

Analyte	True Conc.	02/22/11 18:39 CCV 11 Found	%REC	02/22/11 18:45 CCV 12 Found	%REC
Arsenic	100	103.82	103.8	99.95	100.0
Thallium	50	48.47	96.9	51.02	102.0

Lot Number: G1B120440 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110222B2

Analyte	True Conc.	02/22/11 19:13 CCV 13 Found	%REC
Arsenic	100	91.67	91.7
Thallium	50	44.97	89.9

No Quals Rqd - rounds to 90%

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B170553_LLQS.pdf; G1B170426_LLQS.pdf; G1B120440_LLQS.pdf; G1B120421_LLQS.pdf; G1B110556_LLQS.pdf

Hi Jackie,
Attached are the next 5 files of data for this project.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? un assoc stds.	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than <50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[ ]	[✓]	
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?		[✓]	
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?		[✓]	
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?		[✓]	
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

$\geq$ MDL but $\leq$ CRQL, and

$>$ CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value $\geq$ MDL but $\leq$ CRQL? ✓ [___] ___

See notes - next page

ACTION:
If yes, change sample result $\geq$ MDL

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1B180000161B
Lot Number:	G1B120440	**Lab WorkOrder:**	MEK3P
Matrix:	SOIL	**Lab Sample ID:**	G1B180000161B
Instrument Id:	T01	**Analysis Date/Time:**	2/23/2011 5:29:00PM
Units:	MG/KG		

extracted 2/18

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	26.3000	J	P
Chromium	0.5000	U	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	1.4000	J	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	25.0000	U	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

No Quals - all results in samples > LOD

No Quals - all results in samples > LOD

Result is less than the reporting limit. (RL)
Estimated Result. Result is less than RL.

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[✓]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[✓]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

x3com
JAC
42611

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	✓

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

	YES	NO	N/A
A.1.16.3.3 **ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[___]	___	✓

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%,reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note:Not required for Ca,Mg,K,and Na(both matrices);Al and Fe (soil only)

A.1.17.1 Was Matrix Spike analysis performed:

	YES	NO	N/A
For each matrix type?	[✓]	___	___
For each SDG?	[___]	___	___
On one of the SDG samples?	[___]	___	___
For each concentration range (i.e.,low, med., high)?	[___]	___	___
For each analytical Method (ICP-AES,ICP-MS, Hg, CN)used?	[___]	___	___
Was a spiked sample prepared and analyzed with the SDG samples?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated(J)all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations? **NOTE**: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.	[___]	✓	___
	See Form 5's for notes & any required action			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form 1's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
	JAC 42611			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	✓	[___]	✓
	(b) between 30-74%?	___	[___]	✓
	(c) between 126-150%?	___	[___]	✓
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

	YES	NO	N/A

as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

A.1.17.5 **Soil/Sediment**

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	* ✓	[ ]	
(b) between 10-74%?	✓	[ ]	
(c) between 126-200%?	✓	[✓]	
(d) greater than 200%?	* ✓	[ ]	

JAC 4/26/11

* out due to abundance

See next page for notes - any action

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates] - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

MS/MSD RPD's calc

	YES	NO	N/A
For each SDG?	✓ [ ]		
On one of the SDG samples?	[✓]		
For each matrix type?	[ ]		
For each concentration range (low or med.)?	[ ]		
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[ ]		
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]		

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SD05-000H-0211
Lot Number:	G1B120440	**MS Lab Workorder:**	MEDMW - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B120440005S
% Solids	67.0	**QC Batch ID:**	1049161
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	24000.0000	N	20000.0000		296.0000	1370.0	N	P	NQ *
Antimony	80 - 120	21.7000	N	3.0000		74.0000	29.0	N	P	JWJ
Barium	80 - 120	321.0000		32.7000		296.0000	97.0		P	
Beryllium	80 - 120	6.9200		0.0900	J	7.4000	92.0		P	
Cadmium	80 - 120	6.6300		0.0580	J	7.4000	89.0		P	
Calcium	80 - 120	226000.0000	N	246000.0000	1 RL/	7260.0000	0.0	N	P	NQ *
Chromium	80 - 120	65.7000		35.5000		29.6000	102.0		P	
Cobalt	80 - 120	75.2000		7.9000		74.0000	91.0		P	
Copper	80 - 120	57.4000		17.6000		37.0000	108.0		P	*
Iron	80 - 120	19800.0000	N	17700.0000	B	148.0000	1410.0	N	P	NQ
Lead	80 - 120	64.9000		0.7500		74.0000	88.0		P	
Magnesium	80 - 120	25100.0000		17900.0000		7400.0000	98.0		P	
Manganese	80 - 120	611.0000	N	571.0000		74.0000	54.0	N	P	NQ MSDOK
Nickel	80 - 120	76.7000		10.4000		74.0000	89.0		P	
Potassium	80 - 120	14200.0000		6450.0000		7400.0000	104.0		P	
Silver	75 - 120	7.5700		0.3000		7.4000	101.0		P	
Sodium	80 - 120	13200.0000		5810.0000		7400.0000	100.0		P	
Vanadium	80 - 120	128.0000		53.4000		74.0000	101.0		P	
Zinc	80 - 120	92.1000		25.8000		74.0000	90.0		P	

N Spike sample recovery is outside control limits.

JMC 4/25/11

*No Quals- analyte out due to abundance

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-5SD05-000H-0211
Lot Number:	G1B120440	**MS Lab Workorder:**	MEDMW - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B120440005D
% Solids	67.0	**QC Batch ID:**	1049161
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M
Aluminum	80 - 120	24000.0000	N	20000.0000		305.0000	1320.0	N	P
Antimony	80 - 120	22.8000	N	3.0000		76.3000	30.0	N	P
Barium	80 - 120	330.0000		32.7000		305.0000	97.0		P
Beryllium	80 - 120	7.1500		0.0900	J	7.6300	92.0		P
Cadmium	80 - 120	6.8100		0.0580	J	7.6300	88.0		P
Calcium	80 - 120	233000.0000	N	246000.0000	B RI	7260.0000	0.0	N	P
Chromium	80 - 120	66.8000		35.5000		30.5000	102.0		P
Cobalt	80 - 120	77.0000		7.9000		76.3000	91.0		P
Copper	80 - 120	56.2000		17.6000		38.2000	101.0		P
Iron	80 - 120	19800.0000	N	17700.0000	B	153.0000	1350.0	N	P
Lead	80 - 120	66.9000		0.7500		76.3000	88.0		P
Magnesium	80 - 120	25500.0000		17900.0000		7630.0000	100.0		P
Manganese	80 - 120	637.0000		571.0000		76.3000	87.0		P
Nickel	80 - 120	78.5000		10.4000		76.3000	89.0		P
Potassium	80 - 120	14600.0000		6450.0000		7630.0000	107.0		P
Silver	75 - 120	7.8000		0.3000		7.6300	101.0		P
Sodium	80 - 120	13300.0000		5810.0000		7630.0000	98.0		P
Vanadium	80 - 120	128.0000		53.4000		76.3000	98.0		P
Zinc	80 - 120	91.9000		25.8000		76.3000	87.0		P

*NQ JWJ

*NQ

*NQ

N Spike sample recovery is outside control limits.

JC 4/25/11

*No Quals - analyte out due to abundance

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

146

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[✓]	___
is any RPD ≥ 100%?	___	[✓]	___

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**: Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[✓]	___
> ± 2xCRQL?	___	[✓]	___

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.
NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

	YES	NO	N/A
data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
> ± 2 x CRQL?	___	[✓]	___
> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "x" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1 Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

Sed samples

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[4]	✓
is any RPD ≥ 100%?	___	[4]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[4]	✓
> ± 2 x CRQL?	___	[4]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[✓]	___	___
	ACTION: If yes, for each soil Field Duplicate pair proceed as follows:			
	Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.			

SSD11 SSD12 See next 2 pages for breakdown of FD results

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

		YES	NO	N/A
A.1.19.5	Circle on each Appendix A.4 all values that have:			
	RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ ~~35%~~ 30% but < 120%?	✓	[___]	___
	is any RPD ≥ 120%?	___	[✓]	___
	ACTION: If the RPD is ≥ ~~35%~~ 30% but < 120%,			

See next page for qrals as needed.

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-5SD11-000H-0201
Duplicate Sample ID: VEECA-5SD11P-000H-0201

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	10900	10000	9
arsenic	2.5	2.3	8
barium	18.3	18.3	0
cadmium	0.068	0.063	0.005
calcium	250000	227000	10
chromium	22.5	21.4	5
cobalt	4	4.6	14
copper	12	10.3	15
iron	9890	9970	1
magnesium	9030	9170	2
manganese	310	324	4
nickel	5.9	5.8	2
potassium	3480	3080	12
selenium	2.1	1	71
sodium	4100	3670	11
vanadium	30.7	32.7	6
zinc	14.2	13.5	5

COMMENTS: Qualifications were required-J Se in both samples.
Region II QC limits for flagging were used.

Sample ID: VEECA-5SD02-000H-0201
Duplicate Sample ID: VEECA-5SD02P-000H-0201

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	16100	13700	16
barium	27.1	29.2	7
cadmium	0.14	0.046	0.094
calcium	246000	235000	5
chromium	28.4	25.3	12
cobalt	5.2	5.4	4
copper	11.2	12.6	12
iron	13900	12700	9
magnesium	14300	14500	1
manganese	429	392	9
nickel	7.5	7.2	4
potassium	5630	4840	15
selenium	2.1	2.2	-0.1
sodium	4370	4510	3
vanadium	36.3	35.5	2
zinc	19.4	18.9	3

COMMENTS: No qualifications were required.
Region II QC limits for flagging were used.

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL?	___	[✓]	___
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
A.1.20	**Laboratory Control Sample (LCS)- Form VII**			
A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[✓]	___
Between 121% and 150%?	___	[✓]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[___]	[✓]
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: Designate "Field Blank" as such on Form I

		YES	NO	N/A
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CLQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

✓ dilutions were performed as necessary

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 (per SAP) of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	✓
Was the %RI for the two fold diluted sample within the acceptance limits ~~(60-125%)~~ 30-120 (per SAP)?	[___]	___	✓

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/10
Received Date: 2/12, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 2/28 soils
Analysis Dates: 2/28 soils

All holding time requirements were met.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-5SD05-000H-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: VEECA-5SD11-000H-0211 Duplicate Sample ID: VEECA-5SD11P-000H-0211

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. Positive results between the MDL and the LOQ were reported for the target analyte in two samples. Clarification of the calculations was requested from the laboratory.

Rcd 5/3

Reviewer JA Cleveland **Date:** 4/26/11

Hexavalent Chromium Calcs - ICAL soils - 2/28/11

X - Response	Y - Concentration (mg/L)
0	0
0.004	0.005
0.008	0.01
0.02	0.025
0.04	0.05
0.082	0.1

slope, m (A1) =	1.22097018
y-int. (A0) =	0.000328432
r =	0.99992258
Rr2=	0.999845166

VEECA-5SD14-000H-0211 Lab Value - 0.019J mg/Kg
Response = 0.002

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0.002770372 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.2
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	0.735
Concentration =	0.018386408 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B160524, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B160524. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-EB01-021511-SMI	G1B160524-001	water	X	X	X	X	X
VEECA-EB02-021511-DSS	G1B160524-002	water	X	X	X	X	X
VEECA-3SMI04TT-0211	G1B160524-003	soil	X	X	X	X	X
VEECA-3SMI05-0211	G1B160524-004	soil	X	X	X	X	X
VEECA-3SMI01-0211	G1B160524-006	soil	X	X	X	X	X
VEECA-2SMI02-0211	G1B160524-007	soil	X	X	X	X	X
VEECA-4SMJ08-0211	G1B160524-008	soil	X	X	X	X	X
VEECA-3SMJ02-0211	G1B160524-009	soil	X	X	X	X	X
VEECA-3SMI03-0211	G1B160524-010	soil	X	X	X	X	X
VEECA-3SMI04-0211	G1B160524-011	soil	X	X	X	X	X
VEECA-3SMI04T-0211	G1B160524-012	soil	X	X	X	X	X
VEECA-EB01-021511-SMI MS	G1B160524-001MS	water	X	X	X	X	X
VEECA-EB01-021511-SMI MSD	G1B160524-001MSD	water	X	X	X	X	X
VEECA-3SMI02-0211 MS	G1B160524-009MS	soil	X	X	X	X	X
VEECA-3SMI02-0211 MSD	G1B160524-009MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: samples VEECA-EB01-021511-SMI and VEECA-EB02-021511-DSS-equipment blanks; and samples VEECA-3SMI04T-0211 and VEECA-3SMI04TT-0211-field triplicate samples of sample VEECA-3SMI04-0211.

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	
• HPLC Performance	*
• ICP MS Tuning	*
• Initial/Continuing Calibrations	
• ICSA/ICSAB Standards	*
• LLQ Standards	*
• Blanks	
• Internal Standards	*
• Surrogate Recoveries	*
• Laboratory Control Samples	*
• Certified Reference Material	
• Matrix Spike Recoveries	
• Matrix Duplicate RPDs	*
• Serial Dilutions	
• Field Duplicates	NA
• Field Triplicates	*
• Identification/Quantitation	*
• Reporting Limits	*
• Tentatively Identified Compounds	NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

The Certified Reference Material (CRM) exhibited low recoveries for two compounds that resulted in qualifying the non-detected results as rejected in all samples.

Perchlorate

No qualifications to the data were required.

Metals

One of the associated ICV standards exhibited a high recovery for sodium in the standard associated with the soil samples. Therefore all reported positive results for sodium in the soil samples were qualified as estimated J with a qualifier code of CCH.

Qualification was required for one analyte due to contamination in the associated grinding blank. The Region II guidelines for qualifying samples based on method blanks were applied to the grinding blanks.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

The serial dilution analysis exhibited two non-compliant %Ds. Results were qualified as estimated for the non-compliant analytes.

Hexavalent Chromium

Two field QC blanks exceeded the required 24-hour holding time; therefore the reported results were qualified as estimated.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/14-15/11 and samples were received at the laboratory on 2/16/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Samples VEECA-EB01-021511-SMI and VEECA-EB02-021511-DSS exceeded the 24 hour holding time by approximately 8 hours; therefore the reported results were qualified as estimated J/UJ, with a qualifier code of HT.

Calibrations

Metals

The ICV standard analyzed on 3/4/11 at 15:12 exhibited a recovery for sodium that was above the upper QC limit of 110% at 118.1%. The reported positive results reported for sodium in all of the soil samples were qualified as estimated J with a qualifier code of CCH.

Blanks

Metals

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B160524015	copper selenium	4.5J ug/L 13.1J ug/L	LOD
	sodium	314J ug/L/15.7 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg (157 mg/Kg)

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

Sample ID	Analyte	Q Flag	Q Code
VEECA-2SMI02-0211	copper	U at LOD	GBL
VEECA-3SMI01-0211	selenium	U at LOD	GBL
VEECA-4SMI08-0211	sodium	J	GBL

Certified Reference Material

Explosives

The CRM associated with all samples exhibited low recoveries for 3-nitrotoluene at 63% (QC limit 69-124%) and nitrobenzene at 56% (58-119%); therefore all positive results were qualified as estimated (J) and non-detected results were qualified as rejected (R), qualifier code: CRML.

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-3SMI04TT-0211	antimony	all soil samples	47/47	J/UJ	MSL
	lead		79/77		

Serial Dilutions

Metals

The serial dilution submitted in this SDG exhibited a non-compliant %D for one analyte, requiring qualification in the field samples. A summary of this non-compliance and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag	Q Code
VEECA-3SMI04TT-0211	copper	all soil samples	14.82	J/UJ	SD
	zinc		10.40		

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B160524

Summary of Data Qualifications

Explosives

Sample ID	Compound	Results	Q flag	Q Code
all samples	3-nitrotoluene nitrobenzene	+/-	J/R	CRML

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	sodium	+	J	CCH
VEECA-2SMI02-0211	copper	+J	U at LOD	GBL
VEECA-3SMI01-0211	selenium	+J	U at LOD	GBL
VEECA-4SMI08-0211	sodium**	+J	J	GBL
all soil samples	antimony lead	+/-	J/UJ	MSL
all soil samples	copper* zinc	+/-	J/UJ	SD

**the final qualifier code for copper in sample VEECA-2SMI02-0211 is GBL sample is flagged as U at LOD, then J is added to indicate non-compliant serial dilution results*
***The final qualifier code for sodium in sample VEECA-4SMI08-0211 is CCH.*

Hexavalent Chromium

Sample ID	Compound	Results	Q flag	Q Code
VEECA-EB01-021511-SMI, VEECA-EB02-021511-DSS	hexavalent chromium	+/-	J/UJ	HT

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
RF	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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B160524

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04TT-0211

HPLC

Lot-Sample #...: G1B160524-003 Work Order #...: MEHCL1AX Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/01/11
Prep Batch #...: 1056290 Analysis Time..: 21:31
Dilution Factor: 0.97

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 ~~U~~ R, CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

MM 051111

CH2M Hill Inc

Client Sample ID: VEECA-3SMI05-0211

HPLC

Lot-Sample #...: G1B160524-004 Work Order #...: MEHCV1A5 Matrix.....: SOLID
Date Sampled...: 02/14/11 09:50 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/01/11
Prep Batch #...: 1056290 Analysis Time..: 22:16
Dilution Factor: 0.96

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.6
1,3-Dinitrobenzene	29 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.0
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	12
3-Nitrotoluene	29 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.6
4-Nitrotoluene	29 U	240	ug/kg	17
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	14
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.6

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI01-0211

HPLC

Lot-Sample #...: G1B160524-006 Work Order #...: MEHC31A5 Matrix.....: SOLID
Date Sampled...: 02/14/11 13:00 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/01/11
Prep Batch #...: 1056290 Analysis Time..: 23:02
Dilution Factor: 0.95

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	28 U	240	ug/kg	9.5
1,3-Dinitrobenzene	28 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	28 U	240	ug/kg	18
2,4-Dinitrotoluene	28 U	240	ug/kg	5.0
2,6-Dinitrotoluene	28 U	240	ug/kg	6.9
2-Amino-4,6-dinitrotoluene	28 U	240	ug/kg	12
2-Nitrotoluene	28 U	240	ug/kg	12
3-Nitrotoluene	28 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	28 U	240	ug/kg	9.5
4-Nitrotoluene	28 U	240	ug/kg	17
HMX	28 U	240	ug/kg	11
Nitrobenzene	28 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	57 U	480	ug/kg	14
PETN	57 U	480	ug/kg	24
RDX	28 U	240	ug/kg	11
Tetryl	28 U	240	ug/kg	9.5

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

VM 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-2SMI02-0211

HPLC

Lot-Sample #...: G1B160524-007 Work Order #...: MEHDD1AG Matrix.....: SOLID
Date Sampled...: 02/14/11 09:00 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 00:32
Dilution Factor: 0.95

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	240	ug/kg	8.4
1,3,5-Trinitrobenzene	28 U	240	ug/kg	9.5
1,3-Dinitrobenzene	28 U	240	ug/kg	4.0
2,4,6-Trinitrotoluene	28 U	240	ug/kg	18
2,4-Dinitrotoluene	28 U	240	ug/kg	5.0
2,6-Dinitrotoluene	28 U	240	ug/kg	6.9
2-Amino-4,6-dinitrotoluene	28 U	240	ug/kg	12
2-Nitrotoluene	28 U	240	ug/kg	12
3-Nitrotoluene	28 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	28 U	240	ug/kg	9.5
4-Nitrotoluene	28 U	240	ug/kg	17
HMX	28 U	240	ug/kg	11
Nitrobenzene	28 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	57 U	480	ug/kg	14
PETN	57 U	480	ug/kg	24
RDX	28 U	240	ug/kg	11
Tetryl	28 U	240	ug/kg	9.5

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	95	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VERCA-4SMI08-0211

HPLC

Lot-Sample #...: G1B160524-008 Work Order #...: MEHDF1AP Matrix.....: SOLID
Date Sampled...: 02/14/11 13:50 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 01:17
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R CCML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R CCML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	110	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI02-0211

HPLC

Lot-Sample #...: G1B160524-009 Work Order #...: MEHDH1AX Matrix.....: SOLID
Date Sampled...: 02/14/11 11:50 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 02:02
Dilution Factor: 0.97

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

MM 03/11/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI03-0211

HPLC

Lot-Sample #...: G1B160524-010 Work Order #...: MERDN1AX Matrix.....: SOLID
Date Sampled...: 02/14/11 11:25 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 04:18
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 ~~U~~ R CRML	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 ~~U~~ R CRML	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	94	(81 - 127)

MM 05/11/11

CH2M Hill Inc

Client Sample ID: VERCA-3SMI04-0211

HPLC

Lot-Sample #...: G1B160524-011 Work Order #...: MEHDQ1A6 Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 05:03
Dilution Factor: 0.94

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	28 U	240	ug/kg	8.3
1,3,5-Trinitrobenzene	28 U	240	ug/kg	9.4
1,3-Dinitrobenzene	28 U	240	ug/kg	3.9
2,4,6-Trinitrotoluene	28 U	240	ug/kg	18
2,4-Dinitrotoluene	28 U	240	ug/kg	5.0
2,6-Dinitrotoluene	28 U	240	ug/kg	6.9
2-Amino-4,6-dinitrotoluene	28 U	240	ug/kg	12
2-Nitrotoluene	28 U	240	ug/kg	12
3-Nitrotoluene	28 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	28 U	240	ug/kg	9.4
4-Nitrotoluene	28 U	240	ug/kg	17
HMX	28 U	240	ug/kg	11
Nitrobenzene	28 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	56 U	470	ug/kg	14
PETN	56 U	470	ug/kg	24
RDX	28 U	240	ug/kg	11
Tetryl	28 U	240	ug/kg	9.4

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

MM 03/11/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04T-0211

HPLC

Lot-Sample #...: G1B160524-012 Work Order #...: MEHDT1A5 Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/02/11
Prep Batch #...: 1056290 Analysis Time..: 05:48
Dilution Factor: 0.97

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 ~~U~~ R CRML	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 ~~U~~ R CRML	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	96	(81 - 127)

LW 05/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021511-SMI

HPLC

Lot-Sample #...: G1B160524-001 Work Order #...: MEHCA1A1 Matrix.....: WATER
Date Sampled...: 02/15/11 06:40 Date Received..: 02/16/11
Prep Date.....: 02/18/11 Analysis Date..: 02/26/11
Prep Batch #...: 1049097 Analysis Time..: 10:47
Dilution Factor: 0.98

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.049 U	0.49	ug/L	0.024
1,3,5-Trinitrobenzene	0.049 U	0.098	ug/L	0.030
1,3-Dinitrobenzene	0.049 U	0.15	ug/L	0.049
2,4,6-Trinitrotoluene	0.049 U	0.15	ug/L	0.049
2,4-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2,6-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2-Amino-4,6-dinitrotoluene	0.098 U	0.29	ug/L	0.098
2-Nitrotoluene	0.098 U	0.98	ug/L	0.086
3-Nitrotoluene	0.098 ~~U~~ R CRML	0.49	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.049 U	0.15	ug/L	0.049
4-Nitrotoluene	0.098 U	0.98	ug/L	0.086
HMX	0.049 U	0.15	ug/L	0.035
Nitrobenzene	0.049 ~~U~~ R CRML	0.15	ug/L	0.049
Nitroglycerin	0.49 U	0.98	ug/L	0.32
PETN	0.49 U	0.98	ug/L	0.29
RDX	0.049 U	0.24	ug/L	0.035
Tetryl	0.049 U	0.15	ug/L	0.049

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(84 - 125)

LM 05/11

CH2M Hill Inc

Client Sample ID: VEECA-EB02-021511-DSS

HPLC

Lot-Sample #...: G1B160524-002 Work Order #...: MEHCK1AC Matrix.....: WATER
Date Sampled...: 02/15/11 06:50 Date Received..: 02/16/11
Prep Date.....: 02/18/11 Analysis Date..: 02/26/11
Prep Batch #...: 1049097 Analysis Time..: 11:32
Dilution Factor: 0.98
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.049 U	0.49	ug/L	0.024
1,3,5-Trinitrobenzene	0.049 U	0.098	ug/L	0.030
1,3-Dinitrobenzene	0.049 U	0.15	ug/L	0.049
2,4,6-Trinitrotoluene	0.049 U	0.15	ug/L	0.049
2,4-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2,6-Dinitrotoluene	0.049 U	0.15	ug/L	0.049
2-Amino-4,6-dinitrotoluene	0.098 U	0.29	ug/L	0.098
2-Nitrotoluene	0.098 U	0.98	ug/L	0.086
3-Nitrotoluene	0.098 ~~U~~ R CCML	0.49	ug/L	0.056
4-Amino-2,6-dinitrotoluene	0.049 U	0.15	ug/L	0.049
4-Nitrotoluene	0.098 U	0.98	ug/L	0.086
HMX	0.049 U	0.15	ug/L	0.035
Nitrobenzene	0.049 ~~U~~ R CCML	0.15	ug/L	0.049
Nitroglycerin	0.49 U	0.98	ug/L	0.32
PETN	0.49 U	0.98	ug/L	0.29
RDX	0.049 U	0.24	ug/L	0.035
Tetryl	0.049 U	0.15	ug/L	0.049

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(84 - 125)

WM 05/11/11

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021511-SMI

Dissolved HPLC

Lot-Sample #...: G1B160524-001 Work Order #...: MEHCA1A0 Matrix.....: WATER
Date Sampled...: 02/15/11 06:40 Date Received..: 02/16/11
Prep Date.....: 03/01/11 Analysis Date..: 03/02/11
Prep Batch #...: 1060188 Analysis Time..: 03:36
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

LM
04/21/11

CH2M Hill Inc

Client Sample ID: VERCA-EB02-021511-DSS

Dissolved HPLC

Lot-Sample #...: G1B160524-002 Work Order #...: MEHCK1AA Matrix.....: WATER
Date Sampled...: 02/15/11 06:50 Date Received..: 02/16/11
Prep Date.....: 03/01/11 Analysis Date..: 03/02/11
Prep Batch #...: 1060188 Analysis Time..: 05:04
Dilution Factor: 1

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042111

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04TT-0211

HPLC

Lot-Sample #...:	G1B160524-003	**Work Order #...:**	MEHCL1A0	**Matrix.....:**	SOLID
Date Sampled...:	02/14/11 10:35	**Date Received..:**	02/16/11		
Prep Date.....:	03/09/11	**Analysis Date..:**	03/10/11		
Prep Batch #...:	1068159	**Analysis Time..:**	16:23		
Dilution Factor:	1.02				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.41 U	5.1	ug/kg	0.27

CH2M Hill Inc

Client Sample ID: VRECA-3SMI05-0211

HPLC

Lot-Sample #...: G1B160524-004 Work Order #...: MEHCV1AA Matrix.....: SOLID
Date Sampled...: 02/14/11 09:50 Date Received..: 02/16/11
Prep Date.....: 03/09/11 Analysis Date..: 03/10/11
Prep Batch #...: 1068159 Analysis Time..: 16:41
Dilution Factor: 1.03

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.41 U	5.2	ug/kg	0.27

WM 04/21/11

CH2M Hill Inc

Client Sample ID: VKECA-3SMI01-0211

HPLC

Lot-Sample #...:	G1B160524-006	Work Order #...:	MEHC31AA	Matrix.....:	SOLID
Date Sampled...:	02/14/11 13:00	Date Received..:	02/16/11		
Prep Date.....:	03/09/11	Analysis Date..:	03/10/11		
Prep Batch #...:	1068159	Analysis Time..:	16:58		
Dilution Factor:	0.95				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.27 J	4.8	ug/kg	0.25

NOTE(S):

J Estimated result. Result is less than RL.

MM 04/21/11

CH2M Hill Inc

Client Sample ID: VEECA-2SMI02-0211

HPLC

Lot-Sample #...:	G1B160524-007	Work Order #...:	MEHDD1AJ	Matrix.....:	SOLID
Date Sampled...:	02/14/11 09:00	Date Received..:	02/16/11		
Prep Date.....:	03/09/11	Analysis Date..:	03/10/11		
Prep Batch #...:	1068159	Analysis Time..:	17:16		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.40 J	5.0	ug/kg	0.26

NOTE(S):

J Estimated result. Result is less than RL.

WM 04/2/11

CH2M Hill Inc

Client Sample ID: VKECA-4SMI08-0211

HPLC

Lot-Sample #...:	G1B160524-008	**Work Order #...:**	MEHDF1AR	**Matrix.....:**	SOLID
Date Sampled...:	02/14/11 13:50	**Date Received..:**	02/16/11		
Prep Date.....:	03/09/11	**Analysis Date..:**	03/10/11		
Prep Batch #...:	1068159	**Analysis Time..:**	17:33		
Dilution Factor:	0.92				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	1.5 J	4.6	ug/kg	0.24

NOTE(S):

J Estimated result. Result is less than RL.

CH2M Hill Inc

Client Sample ID: VERCA-3SMI02-0211

HPLC

Lot-Sample #...: G1B160524-009 **Work Order #...:** MEHDH1A1 **Matrix.....:** SOLID
Date Sampled...: 02/14/11 11:50 **Date Received..:** 02/16/11
Prep Date.....: 03/09/11 **Analysis Date..:** 03/10/11
Prep Batch #...: 1068159 **Analysis Time..:** 18:26
Dilution Factor: 0.95

Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.38 U	4.8	ug/kg	0.25

CH2M Hill Inc

Client Sample ID: VEECA-3SMI03-0211

HPLC

Lot-Sample #...:	G1B160524-010	**Work Order #...:**	MEHDN1A1	**Matrix.....:**	SOLID
Date Sampled...:	02/14/11 11:25	**Date Received..:**	02/16/11		
Prep Date.....:	03/09/11	**Analysis Date..:**	03/10/11		
Prep Batch #...:	1068159	**Analysis Time..:**	19:18		
Dilution Factor:	0.98				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.39 U	4.9	ug/kg	0.25

LM 04/2/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04-0211

HPLC

Lot-Sample #...: G1B160524-011 Work Order #...: MEHDQ1AC Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11
Prep Date.....: 03/09/11 Analysis Date..: 03/10/11
Prep Batch #...: 1068159 Analysis Time..: 19:36
Dilution Factor: 1.03
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.41 U	5.2	ug/kg	0.27

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04T-0211

HPLC

Lot-Sample #...:	G1B160524-012	Work Order #...:	MEHDT1AA	Matrix.....:	SOLID
Date Sampled...:	02/14/11 10:35	Date Received..:	02/16/11		
Prep Date.....:	03/09/11	Analysis Date..:	03/10/11		
Prep Batch #...:	1068159	Analysis Time..:	19:54		
Dilution Factor:	0.98				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.39 U	4.9	ug/kg	0.25

LM 04/21/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-021511-SMI
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHCA
Matrix:	WATER	**Lab Sample ID:**	G1B160524001
% Solids:	0.0	**Date/Time Collected:**	02/15/11 6:40
Units:	UG/L	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

JAC 42811

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB02-021511-DSS
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHCK
Matrix:	WATER	**Lab Sample ID:**	G1B160524002
% Solids:	0.0	**Date/Time Collected:**	02/15/11 6:50
Units:	UG/L	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

JAC 42811

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI04TT-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHCL
Matrix:	SOIL	**Lab Sample ID:**	G1B160524003
% Solids:	100.0	**Date/Time Collected:**	02/14/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	6090.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	1.9000	J		P
7440-39-3	Barium	10.9000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	259000.00	~~B RLA~~		P
7440-47-3	Chromium	14.3000			P
7440-48-4	Cobalt	2.9000	J		P
7440-50-8	Copper	7.3000	~~J~~	J SD	P
7439-89-6	Iron	7170.0000			P
7439-92-1	Lead	5.0000	~~GU~~	UJ MSL	P
7439-95-4	Magnesium	9890.0000			P
7439-96-5	Manganese	161.0000			P
7440-02-0	Nickel	3.6000	J		P
7440-09-7	Potassium	1620.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	7860.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	20.8000			P
7440-66-6	Zinc	10.7000		J SD	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JPC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI05-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHCV
Matrix:	SOIL	**Lab Sample ID:**	G1B160524004
% Solids:	100.0	**Date/Time Collected:**	02/14/11 9:50
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1840.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	9.1000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	290000.00	~~B RLA~~		P
7440-47-3	Chromium	6.6000			P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	3.1000	~~J~~	J SD	P
7439-89-6	Iron	1840.0000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	9890.0000			P
7439-96-5	Manganese	52.5000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	625.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	7620.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	6.6000	J		P
7440-66-6	Zinc	3.8000	~~J~~	J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JLC 42811

Form I Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI01-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHC3
Matrix:	SOIL	**Lab Sample ID:**	G1B160524006
% Solids:	100.0	**Date/Time Collected:**	02/14/11 13:00
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	11900.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.9000	J		P
7440-39-3	Barium	73.2000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	108000.00	~~B~~		P
7440-47-3	Chromium	31.5000			P
7440-48-4	Cobalt	8.9000			P
7440-50-8	Copper	16.1000		J SD	P
7439-89-6	Iron	17800.000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	7500.0000			P
7439-96-5	Manganese	422.0000			P
7440-02-0	Nickel	10.7000			P
7440-09-7	Potassium	2380.0000			P
7782-49-2	Selenium	~~1.5000~~ 2.0	+	U GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	7230.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	61.6000			P
7440-66-6	Zinc	22.8000		J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

Results and reporting limits have been adjusted for dry weight

JAC 42811

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-2SMI02-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDD
Matrix:	SOIL	**Lab Sample ID:**	G1B160524007
% Solids:	100.0	**Date/Time Collected:**	02/14/11 9:00
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	1030.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	7.9000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	285000.00	~~B RLA~~		P
7440-47-3	Chromium	6.2000			P
7440-48-4	Cobalt	2.5000	U		P
7440-50-8	Copper	~~2.3000~~ 2.5	~~+~~	UJ GBL	P
7439-89-6	Iron	1440.0000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	10000.000			P
7439-96-5	Manganese	46.3000			P
7440-02-0	Nickel	2.5000	U		P
7440-09-7	Potassium	293.0000	J		P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2150.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	4.0000	J		P
7440-66-6	Zinc	2.5000	~~J~~	J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/28/11

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SMI08-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDF
Matrix:	SOIL	**Lab Sample ID:**	G1B160524008
% Solids:	100.0	**Date/Time Collected:**	02/14/11 13:50
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	22100.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	8.8000			P
7440-39-3	Barium	26.7000			P
7440-41-7	Beryllium	0.2700	J		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	105000.00	~~B~~		P
7440-47-3	Chromium	37.2000			P
7440-48-4	Cobalt	7.3000			P
7440-50-8	Copper	19.4000		J SD	P
7439-89-6	Iron	23500.000			P
7439-92-1	Lead	1.5000	~~J~~	J MSL	P
7439-95-4	Magnesium	6530.0000			P
7439-96-5	Manganese	528.0000			P
7440-02-0	Nickel	11.7000			P
7440-09-7	Potassium	4460.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	252.0000	J ~~J~~	GBL	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	48.2000			P
7440-66-6	Zinc	33.8000		J SD	P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI02-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDH
Matrix:	SOIL	**Lab Sample ID:**	G1B160524009
% Solids:	100.0	**Date/Time Collected:**	02/14/11 11:50
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	10700.000			P
7440-36-0	Antimony	10.0000	U	UJ MBL	P
7440-38-2	Arsenic	4.8000	J		P
7440-39-3	Barium	17.2000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	152000.00	B		P
7440-47-3	Chromium	24.3000			P
7440-48-4	Cobalt	5.0000			P
7440-50-8	Copper	11.1000		J SD	P
7439-89-6	Iron	12900.000			P
7439-92-1	Lead	2.5000	U	UJ MBL	P
7439-95-4	Magnesium	6610.0000			P
7439-96-5	Manganese	203.0000			P
7440-02-0	Nickel	7.1000			P
7440-09-7	Potassium	2890.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	8570.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	45.4000			P
7440-66-6	Zinc	16.1000		J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SM103-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDN
Matrix:	SOIL	**Lab Sample ID:**	G1B160524010
% Solids:	100.0	**Date/Time Collected:**	02/14/11 11:25
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	5660.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	12.4000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	246000.00	~~B~~		P
7440-47-3	Chromium	11.2000			P
7440-48-4	Cobalt	1.5000	J		P
7440-50-8	Copper	6.4000	~~J~~	J SD	P
7439-89-6	Iron	4620.0000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	8050.0000			P
7439-96-5	Manganese	87.7000			P
7440-02-0	Nickel	2.6000	J		P
7440-09-7	Potassium	1690.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	7260.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	13.2000			P
7440-66-6	Zinc	7.6000	~~J~~	J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI04-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDQ
Matrix:	SOIL	**Lab Sample ID:**	G1B160524011
% Solids:	100.0	**Date/Time Collected:**	02/14/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	7130.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	11.9000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	222000.00	~~B~~		P
7440-47-3	Chromium	15.7000			P
7440-48-4	Cobalt	3.4000	J		P
7440-50-8	Copper	7.9000		J SD	P
7439-89-6	Iron	8040.0000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	9160.0000			P
7439-96-5	Manganese	174.0000			P
7440-02-0	Nickel	4.0000	J		P
7440-09-7	Potassium	1770.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	7160.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	23.1000			P
7440-66-6	Zinc	11.9000		J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42811

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI04T-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDT
Matrix:	SOIL	**Lab Sample ID:**	G1B160524012
% Solids:	100.0	**Date/Time Collected:**	02/14/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	4450.0000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	9.9000	J		P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	248000.00	~~B~~		P
7440-47-3	Chromium	10.8000			P
7440-48-4	Cobalt	1.7000	J		P
7440-50-8	Copper	5.1000	~~J~~	J SD	P
7439-89-6	Iron	5240.0000			P
7439-92-1	Lead	2.5000	~~U~~	UJ MSL	P
7439-95-4	Magnesium	9220.0000			P
7439-96-5	Manganese	117.0000			P
7440-02-0	Nickel	2.1000	J		P
7440-09-7	Potassium	1220.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	6140.0000		J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	14.6000			P
7440-66-6	Zinc	7.6000	~~J~~	J SD	P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021511-SMI

General Chemistry

Lot-Sample #...: G1B160524-001 Work Order #...: MEHCA Matrix.....: WATER
Date Sampled...: 02/15/11 06:40 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/16/11	1047282

Dilution Factor: 1 Analysis Time..: 15:35 DL.....: 2.0

JAC 42811

CH2M Hill Inc

Client Sample ID: VERCA-EB02-021511-DSS

General Chemistry

Lot-Sample #...: G1B160524-002 Work Order #...: MEHCK Matrix.....: WATER
Date Sampled...: 02/15/11 06:50 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/16/11	1047282

Dilution Factor: 1 Analysis Time..: 15:36 DL.....: 2.0

JJC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04TT-0211

General Chemistry

Lot-Sample #...: G1B160524-003 Work Order #...: MEHCL Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137

Dilution Factor: 1 Analysis Time..: 14:21 DL.....: 0.010

JC 42811

CH2M Hill Inc

Client Sample ID: VEECA-3SMI05-0211

General Chemistry

Lot-Sample #...: G1B160524-004 Work Order #...: MEHCV Matrix.....: SOLID
Date Sampled...: 02/14/11 09:50 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.7	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 12:52	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:24	DL.....: 0.010	

JLC 4/28/11

CH2M Hill Inc

Client Sample ID: VERCA-3SMI01-0211

General Chemistry

Lot-Sample #...: G1B160524-006 Work Order #...: MEHC3 Matrix.....: SOLID
Date Sampled...: 02/14/11 13:00 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.6	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 12:56	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:25	DL.....: 0.010	

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-2SMI02-0211

General Chemistry

Lot-Sample #...: G1B160524-007 Work Order #...: MEHDD Matrix.....: SOLID
Date Sampled...: 02/14/11 09:00 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.8	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 13:00	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:27	DL.....: 0.010	

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-4SMI08-0211

General Chemistry

Lot-Sample #...: G1B160524-008 Work Order #...: MEHDF Matrix.....: SOLID
Date Sampled...: 02/14/11 13:50 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.2	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 13:04	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:28	DL.....: 0.010	

JAC 42811

CH2M Hill Inc

Client Sample ID: VKECA-3SMI02-0211

General Chemistry

Lot-Sample #...: G1B160524-009 Work Order #...: MEHDH Matrix.....: SOLID
Date Sampled...: 02/14/11 11:50 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	03/01/11	1060380
	Dilution Factor: 1			Analysis Time..: 13:09	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
	Dilution Factor: 1			Analysis Time..: 14:28	DL.....: 0.010	

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VERCA-3SMI03-0211

General Chemistry

Lot-Sample #...: G1B160524-010 Work Order #...: M8HDN Matrix.....: SOLID
Date Sampled...: 02/14/11 11:25 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.7	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 13:13	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:29	DL.....: 0.010	

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VERCA-3SMI04-0211

General Chemistry

Lot-Sample #...: G1B160524-011 Work Order #...: MEHDQ Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.8	0.10	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 13:17	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137
		Dilution Factor: 1		Analysis Time..: 14:29	DL.....: 0.010	

JLC 42811

CH2M Hill Inc

Client Sample ID: VKECA-3SMI04T-0211

General Chemistry

Lot-Sample #...: G1B160524-012 Work Order #...: MEHDT Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137

Dilution Factor: 1 Analysis Time..: 14:30 DL.....: 0.010

JAC 4/28/11

Case Narrative

TestAmerica West Sacramento Project Number G1B160524

General Comments

Please note that all samples were received outside of the recommended 2-6 degrees Celsius (C). The temperature of samples in coolers 1 and 3 was measured as 1 degree C. The temperature blanks for all coolers were measured as 0 degree C. Wet ice was used as the cooling agent.

The sample VEECA-EB01-021511-SMI was received at the laboratory past the recommended 24 hour holding time for hexavalent chromium.

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Samples for analysis of all methods were processed by Incremental Sampling Method techniques (ISM) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

The data for the laboratory duplicate and triplicate are reported as samples 13 and 14 for all methods. The native sample is 12, client ID VEECA-3SMI04T-0211. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of each summary section.

* The data for sample VEECA-3SB04-001H-0211 was reported in lab lot G1B170426. doesn't apply for this SDG JAC 42811

SOLID, 8330B, Nitroaromatics & Nitramines
Samples: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
The certified reference material (CRM) associated with this extraction batch and reported as work order MEWD51AE has a low recovery, outside the established control limits for Nitrobenzene and 3-Nitrotoluene. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control.

The grinding blank associated with these samples has been reported as a method blank with work order MEWD51AD.

Case Narrative

TestAmerica West Sacramento Project Number G1B160524

WATER, 8330B, Nitroaromatics & Nitramines
Samples: 1, 2
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
In accordance with the requirements of method 6850, both a LCS and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MFD591AC
SMCS: MFD591AF

Additionally, a CRM (workorder MFD591AE) was analyzed with the associated samples and is reported on the LCS data evaluation and recovery reports, differentiated by the work order number.

The grinding blank associated with these samples has been reported as a method blank with work order MED591AD..

Samples: 4, 6, 7, 13
Manual integration was performed on the above sample for perchlorate primary ion and secondary ion. Detailed information can be found in the Manual Integration Addendum section of this report.

WATER, 6850/DOD Handbook, Perchlorate
Samples: 1, 2
In accordance with the requirements of method 6850, both a LCS and a SMCS were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: ME1QH1AC
SMCS: ME1QH1AD

SOLID, 6010B, Metals
Samples: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
Due to a lab error sample VEECA-3SMI04TT-0211 was set up for MS/MSD for this analysis, not the client designated sample VEECA-3SMI02-0211. The client was notified and accepted this change.

Case Narrative

TestAmerica West Sacramento Project Number G1B160524

SOLID, 6010B, Metals (continued)
Samples: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
The recoveries for aluminum, antimony, calcium, iron, lead, manganese and sodium are outside the established control limits for the MS/MSD associated with this batch. The concentrations of aluminum, calcium, iron, and manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

The method blank associated with this extraction batch has calcium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

Due to historical results, all samples were analyzed and reported at a 5x dilution. Samples 3, 3MS, 3SD, and 4 required additional dilutions for calcium and lead. Sample 7 required an additional dilution for calcium.

An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -15.

WATER, 6010B, Metals
Samples:
The method blank associated with this extraction batch has iron detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

SOLID, 7196A, Hexavalent Chromium
Samples: 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
Due to a lab error sample VEECA-3SMI04TT-0211 was set up for MS/MSD for this analysis, not the client designated sample VEECA-3SMI02-0211. The client was notified and accepted this change.

An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -15.

WATER, 7196A, Hexavalent Chromium
Samples: 1, 2
The noted samples were received in the laboratory after the recommended 24 hour holding time for the test had expired. The samples were analyzed after consultation with the client.

Case Narrative

TestAmerica West Sacramento Project Number G1B160524

There are no other anomalies associated with this project.

Sample Summary

TestAmerica West Sacramento Project Number G1B160524

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEHCA	1	VEECA-EB01-021511-SMI	2/15/2011 06:40 AM	2/16/2011 10:10 AM
MEHCK	2	VEECA-EB02-021511-DSS	2/15/2011 06:50 AM	2/16/2011 10:10 AM
MEHCL	3	VEECA-3SMI04TT-0211	2/14/2011 10:35 AM	2/16/2011 10:10 AM
MEHCV	4	VEECA-3SMI05-0211	2/14/2011 09:50 AM	2/16/2011 10:10 AM
MEHC3	6	VEECA-3SMI01-0211	2/14/2011 01:00 PM	2/16/2011 10:10 AM
MEHDD	7	VEECA-2SMI02-0211	2/14/2011 09:00 AM	2/16/2011 10:10 AM
MEHDF	8	VEECA-4SMI08-0211	2/14/2011 01:50 PM	2/16/2011 10:10 AM
MEHDH	9	VEECA-3SMI02-0211	2/14/2011 11:50 AM	2/16/2011 10:10 AM
MEHDN	10	VEECA-3SMI03-0211	2/14/2011 11:25 AM	2/16/2011 10:10 AM
MEHDQ	11	VEECA-3SMI04-0211	2/14/2011 10:35 AM	2/16/2011 10:10 AM
MEHDT	12	VEECA-3SMI04T-0211	2/14/2011 10:35 AM	2/16/2011 10:10 AM
MEHDV	13	VEECA-3SMI04T-0211	2/14/2011 10:3 AM	2/16/2011 10:10 AM
MEHDX	14	VEECA-3SMI04T-0211	2/14/2011 10:35 AM	2/16/2011 10:10 AM
ME6EE	15	Grinding Blank	2/28/2011	2/28/2011

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B160524

G1B160524

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6206
Fax #: (773) 696-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach State:VA Zip Code: 23462

Project #: 408040.FLFK.EC
Proj. Name/No.: ECA-RI
Airbill number: 873893134160

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Stephen Brand Stephen Brand
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

*	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *wet for explosives	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8330 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-EB01-021511-SMI	02-15-11 0840	AQ	5									2	1	1	1					
	VEECA-EB02-021511-DSS	02-15-11 0850	AQ	5									2	1	1	1					
	VEECA-3SMI04TT-0211	02-14-11 1035	SMI	3	3																no pH for TT sample
	VEECA-3SMI05-0211	02-14-11 0950	SMI	3		3															

COMMENTS: 28-Day Turn Around Time, non-hazard.
62/16/11-1135

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
Stephen Brand	2/15/11 1200	Cheng Uh				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

cooler 3

1

TestAmerica West Sacramento (916) 373 - 5600

1-23-7

10 of 1812

0059

G1B160524

Cooler 2

G1B160524

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, Ph: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6206
Fax #: (773) 895-1378

Address: 6700 Cleveland St, Suite 101
City: Virginia Beach State: VA Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 873693134138

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Stephen Brand Stephen Brand
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C
FEDEX
Temp Blank
UPS
Intact
CLIENT
Not Intact

	Sample Description	Date/Time Collected	Matrix (sq, sd, se, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for holdtimes	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL (Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)			1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 250ml HDPE	Container
					Soil MS			8330 Metals + pH, "Metals Only" for battery disposal area			Grain size	8330 water	8650 water	total metal water	ionic HexCr water	ionic metal water	ionic HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace			None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-3SMI02-0211	02-14-11 1150	SMI	2		2															
	VEECA-3SMI02-0211-MS																				no pH for MS
	VEECA-3SMI02-0211-SD																				no pH for SD
10	VEECA-3SMI03-0211	02-14-11 1126	SMI	2		2															
11	VEECA-3SMI04-0211	02-14-11 1035	SMI	3		3															
12	VEECA-3SMI04T-0211	02-14-11 1035	SMI	3	3																no pH for T sample

COMMENTS: 28-Day Turn Around Time, non-hazard, 02/16/11 - 1135

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
Stephen Brand	2/15/11 1200	[illegible]				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 373 - 5600

3

G1B160524

Cooler I

G1B160524

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6206
Fax #: (773) 595-1375

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FLPK.BC
Proj. Name/No.: ECA-RI
Airbill number: 5736 9313 4149

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Stephen Brand Stephen Brand
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info: FEDEX UPS CLIENT
Airbill No:
Temp C Temp Blank Intact Not Intact

	Sample Description	Date/Time Collected	Matrix (sq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) not for explosives	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	F METAL (Liquid List ICP-AES, ICP-MS)	F METAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6860 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-3SB04-001H-0211	02-14-11 0830	sb	1					1												
	VEECA-3SB04-001H-0211-MS	02-14-11 0830	sb	1				1													
	VEECA-3SB04-001H-0211-SD	02-14-11 0830	sb	1				1													
	VEECA-3SMI01-0211	02-14-11 1300	SMI	3		3															
	VEECA-2SMI02-0211	02-14-11 0900	SMI	3		3															
	VEECA-4SMI08-0211	02-14-11 1350	SMI	3		3															

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
Stephen Brand	2/15/11 1200	Tang Vue	02/16/11 1135			
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 374-4442

12 of 1812

061

2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B160524

KB 3/17/11

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB	2	2																		
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ			3	3		3	3	3	2	2	3	3	3	3						
250AGJ					3															
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn	1	1																		
500PJna																				
500PJzn/na																				
250PJ	2	2																		
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M Hill PM KS LOG # 69380

LOT# (QUANTIMS ID) G1B160524 QUOTE# 58113 LOCATION W12D

Checked (✓)

DATE RECEIVED 02/16/11 TIME RECEIVED 10:10 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☒ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) See Multi Cooler Checklist ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☑

Initials: VV Date: 02/16/11

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: VV Date: 02/16/11

Notes See multi cooler checklist for temperatures.

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

G1B160524

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B160524

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AGBs	500PJn	250PJn	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2
			X		✓	✓																		
500PJna	500PJzn/na	250PJna	250PJzn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

TestAmerica West Sacramento 916.373.5600

064

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): G1B160524

Checked (✓)

COOLER ID Cooler 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 602474, 602473 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: -1 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 0 1 AVERAGE: 0 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ # 5☐ ☐ OTHER ☑

COOLER ID Cooler 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600177, 600178 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: -1 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 1 3 AVERAGE: 2 CORRECTED 3 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

COOLER ID Cooler 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600176, 600175 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: -1 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 0 0 0 AVERAGE: 0 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4☑ #5☐ ☐ OTHER ☑

AV 02/16/11

Initials Date

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B160524

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ IY ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/14/11 Prep 2/18-25/11

8.0 Holding Times Recd 2/16 Analy 2/26-3/1/11

8.1 Have any nitroaromatics and nitroamines technical

 Temp 1-3°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? Listed on Form I

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? Listed on Form I

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided just Std dev + value [ ] ___ ✓

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

LABORATORY CONTROL SAMPLE EVALUATION REPORT

HPLC

Client Lot #...: G1B160524 Work Order #...: MEWD51AE Matrix.....: SOLID
LCS Lot-Sample#: G1B250000-290
Prep Date.....: 02/25/11 Analysis Date..: 03/01/11
Prep Batch #...: 1056290 Analysis Time..: 20:46
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
1,3,5-Trinitrobenzene	98	(58 - 116)	SW846 8330B
1,3-Dinitrobenzene	94	(69 - 116)	SW846 8330B
2,4,6-Trinitrotoluene	93	(69 - 120)	SW846 8330B
2,4-Dinitrotoluene	94	(69 - 137)	SW846 8330B
2,6-Dinitrotoluene	85	(60 - 121)	SW846 8330B
2-Amino-4,6-dinitrotoluene	85	(56 - 108)	SW846 8330B
2-Nitrotoluene	72	(67 - 117)	SW846 8330B
3-Nitrotoluene	63 a JR	(69 - 124)	SW846 8330B
4-Amino-2,6-dinitrotoluene	76	(46 - 98)	SW846 8330B
4-Nitrotoluene	70	(63 - 123)	SW846 8330B
HMX	96	(59 - 131)	SW846 8330B
Nitrobenzene	56 a JR	(58 - 119)	SW846 8330B
Nitroglycerin	77	(60 - 115)	SW846 8330B
PETN	89	(60 - 115)	SW846 8330B
RDX	99	(62 - 123)	SW846 8330B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	103	(81 - 127)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___ ✓ CRM

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓ ✓ CRM

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
___out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB01-021511-SMI MO

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18

column 2: Synergi Hydro-RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] ✓ ___

not provided only std dev + value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

W/in 1 min

YES NO N/A

ACTION i:If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW. Data Validator checked CCal in sequence and compared RT to check stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns. NO (X)

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%	none
26-70%	"J"
71-100%	"NJ"
101-200% (No Interference)	"R"
101-200% (Interference detected)**	"NJ"
>50% (Analyte value is <CRQL)	"U"
>200%	"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate → VEECA-3SMI04-0211 no ⊕

Initial Calibration Date: 1/9/2011

RRF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 48.9000

Height of Compound	2445
Conc. of Compound	50
Calculated RF	48.900

Compound Name: nitrobenzene
Lab Value: 9.1

RF of STD 1	79.20
RF of STD 2	78.60
RF of STD 3	73.50
RF of STD 4	73.10
RF of STD 5	70.20
RF of STD 6	72.35
RF of STD 7	66.88
RF of STD 8	59.02
Calculated % RSD	9.1

Continuing Calibration File ID: 2/26/11, 8:31

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	10227
Conc. of Compound	100
Calculated RF	102.270

Compound Name: tertyl
Lab Value: 10

Average RF	92.905
RF of CCV	102.270
Calculated % D	-10

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/18/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MR 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
METHOD ID: 8330
COLUMN PHASE: Zorbax CN
DIMENSIONS: 250 x 4.6mm 5u
COLUMN SN: USJT010289
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.88	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.88	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/14/11
Received Date: 2/16/11
Prep Date: 3/1-9/11
Analysis Dates: 3/2-10/11
Cooler Temp: 1-3°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
~ RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

No contamination was noted in the method and/or grinding blanks - no qualifications required. Associated QC blanks were: VEECA-EB01-021511-SMI (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-EB01-021511 and VEECA-3SMI02-0211-all criteria met.

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was submitted for VEECA-3SMI04-0211-no positive results were exhibited, no qualifications.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer_____ **Date:** 4/21/11

	YES	NO	N/A
A.1.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.1.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.1.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.1.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[___]	___	✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	✓

JAC
x1 corr
42811

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?		[✓]	
(b) all analytes analyzed by ICP-MS?		[✓]	
(c) Mercury?		[ ]	✓
(d) Cyanide?		[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]		
Digestion Log for ICP-MS (Form XII) present?	[✓]		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments?	✓		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

values present not validated

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?	_	[_]	✓
	Mercury analysis(28 days) exceeded?	_	[_]	✓
	Other Metals analysis(180 days)exceeded?	_	[✓]	_

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

		YES	NO	N/A
	Metals Analysis ≤ 2?	[✓]	_	_
	Cyanide Analysis ≥ 12?	[_]	_	✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]	_	_

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B160524

3/8, 1629

ICP - AES	
SAMPLE ID	VEECA-2SMI02-0211
ANALYTE	manganese
Lab Value CONCENTRATION (mg/Kg)	46.3
AMOUNT FROM RAW DATA (ug/ml)	0.094583
SAMPLE SIZE (g)	0.997
FINAL VOLUME (ml)	50
DILUTION FACTOR	10
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	47.434

3/14, 1449

ICP-MS	
SAMPLE ID	VEECA-3SMI02-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	4.8
AMOUNT FROM RAW DATA (ug/L)	9.508531
SAMPLE SIZE (g)	0.995
FINAL VOLUME (L)	0.05
DILUTION FACTOR	10
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	4.77816

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

dilutions were performed as necessary but not noted on form 1's.

A.1.11 **Initial Calibration**

A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

Is one initial calibration standard at the CRQL level for cyanide and mercury?	[✓]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ". **NOTE**: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

See following pages for any necessary flags

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/04/11 15:12 ICV4 Found %REC	03/04/11 15:14 ICV2A Found %REC
Lead	250	257.98 103.2	
Magnesium	0		1.42 0.0
	10000	9866.1 98.7	
Manganese	0		
	1000	1035.5 103.6	
Nickel	0		
	1000	1030.9 103.1	
Potassium	0		67.37 0.0
	10000	9972.4 99.7	
Silver	0		
	250	244.09 97.6	
Sodium	10000	11813 118.1	
	25000		26138 104.6
Vanadium	0		
	1000	980.51 98.1	
Zinc	0		2.49 0.0
	1000	998.35 99.8	

all soils associated - J + Na results

UTEN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:19 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B160524_LLQS.pdf; G1B040475_LLQS.pdf; G1B230594_LLQS.pdf; G1B190434_LLQS.pdf; G1B180604_LLQS.pdf

Good afternoon Jackie,
Attached are the LLQS data for 5 of the projects. I'll send the others in following e-mails. Please note that the 6010 data is from instrument Thermo and PO5 and the 6020 data is from M01 & M02. The file name and time will on these forms will help you associate them back to the run logs. Please let me know if you have any questions.

I'll follow up with the production group on the status of the other forms you're awaiting – Explosives Form X equivalent and retention time windows forms.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.) LLQS analyzed per lab SOP	[✓]		
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]		
For each mercury run, was a CRQL standard analyzed?	[ ]		✓
For each cyanide run, was a CRQL standard analyzed?	[ ]		✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? @ beginning of runs only [ ] ✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? For associated LLQS.	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	___

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than <50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	___	[✓]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

See following pages for any quals due to gunking blank

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ___ [✓] ___

ACTION:
If yes, change sample result ≥ MDL

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C040000112B
Lot Number:	G1B160524	**Lab WorkOrder:**	ME65K
Matrix:	SOIL	**Lab Sample ID:**	G1C040000112B
Instrument Id:	T01	**Analysis Date/Time:**	3/4/2011 4:10:00PM
Units:	MG/KG		

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	8.1000	J	P
Chromium	0.5000	U	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	5.0000	U	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	25.0000	U	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

no Quals

Result is less than the reporting limit. (RL)
Estimated Result. Result is less than RL.

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C010000241B
Lot Number:	G1B160524	**Lab WorkOrder:**	ME111
Matrix:	WATER	**Lab Sample ID:**	G1C010000241B
Instrument Id:	T01	**Analysis Date/Time:**	3/1/2011 5:19:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	20.9000	J	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	250.0000	U	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

Field QC blks only
no Quals

Result is less than the reporting limit. (RL)
Estimated Result. Result is less than RL.

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	Grinding Blank
Lot Number:	G1B160524	**Lab WorkOrder:**	ME6EE
Matrix:	WATER	**Lab Sample ID:**	G1B160524015
% Solids:	0.0	**Date/Time Collected:**	02/28/11 0:00
Units:	UG/L	**Date/Time Received:**	02/28/11 0:00

CAS No.	Analyte	Concentration	C	Q	Method	
7429-90-5	Aluminum	100.0000	U		P	
7440-36-0	Antimony	20.0000	U		P	
7440-38-2	Arsenic	10.0000	U		P	
7440-39-3	Barium	5.0000	U		P	
7440-41-7	Beryllium	1.0000	U		P	
7440-43-9	Cadmium	1.0000	U		P	
7440-70-2	Calcium	273.0000	J		P	NQ
7440-47-3	Chromium	5.0000	U		P	
7440-48-4	Cobalt	5.0000	U		P	
7440-50-8	Copper	4.5000	J		P	✓ flag U @ LOD in some
7439-89-6	Iron	50.0000	U		P	
7439-92-1	Lead	5.0000	U		P	
7439-95-4	Magnesium	77.5000	J		P	NQ
7439-96-5	Manganese	5.0000	U		P	
7440-02-0	Nickel	5.0000	U		P	
7440-09-7	Potassium	162.0000	J		P	NQ
7782-49-2	Selenium	13.1000	J		P	✓ U @ LOD in 1
7440-22-4	Silver	2.0000	U		P	
7440-23-5	Sodium	314.0000	J		P	J @ Rep Val in 1
7440-28-0	Thallium	5.0000	U		P	
7440-62-2	Vanadium	5.0000	U		P	
7440-66-6	Zinc	3.1000	J		P	NQ

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[___]	✓

ACTION:

	YES	NO	N/A
If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			

A.1.16 **ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV**

NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg.

	YES	NO	N/A
A.1.16.1 Present and complete?	[✓]		
Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	x1 corr JAC 4284 [✓]	✓	@ beginning only
Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]		

ACTION:
If no, flag as estimated (J) all sample results.

A.1.16.2 **ICP-AES Method**

A.1.16.2.1 **ICSA Solution:**

	YES	NO	N/A
For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]		
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]		✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated only sample results ≥MDL

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

	YES	NO	N/A
A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.

A rinse blank was spiked for assoc. with the rinse blanks. Not used to assess field samples -

A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	[✓]	___

NOTE:
Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.

	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.

A.1.17.4 **Aqueous**

Are any spike recoveries:

QC BLKS only

(a) less than 30%?	___	[___]	[✓]
(b) between 30-74%?	___	[___]	___
(c) between 126-150%?	___	[___]	___
(d) greater than 150%?	___	[___]	___

ACTION:
If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-~~74~~ 79%?	✓	[___]	___
(c) between ~~126~~ 120-200%?	✓	[___]	___
(d) greater than 200%?	✓	[___]	___

*Out due to abundance OR only 1 out

ACTION:
If yes for any of the above, proceed as follows:

See pages following for quals

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

For each SDG?	[✓]	___	___
On one of the SDG samples?	[✓]	___	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD RPDs

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-3SM104TT-0211
Lot Number:	G1B160524	**MS Lab Workorder:**	MEHCL - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B160524003S
% Solids	100.0	**QC Batch ID:**	1063112
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	7450.0000	N	6090.0000		101.0000	1350.0	N	P	NQ
Antimony	80 - 120	12.6000	N	10.0000		25.2000	47.0	N	P	J/UJ
Barium	80 - 120	111.0000		10.9000		101.0000	99.0		P	
Beryllium	80 - 120	2.2500		0.5000		2.5200	89.0		P	
Cadmium	80 - 120	2.3900		0.5000		2.5200	92.0		P	
Calcium	80 - 120	272000.0000	N	259000.0000	1 RL/	2520.0000	552.0	N	P	NQ
Chromium	80 - 120	25.0000		14.3000		10.1000	106.0		P	
Cobalt	80 - 120	26.5000		2.9000	J	25.2000	94.0		P	
Copper	80 - 120	20.2000		7.3000	J	12.6000	103.0		P	
Iron	80 - 120	8100.0000	N	7170.0000		50.4000	1840.0	N	P	NQ
Lead	80 - 120	19.9000	N	5.0000	G	25.2000	79.0	N	P	J/UJ
Magnesium	80 - 120	12600.0000		9890.0000		2520.0000	108.0		P	
Manganese	80 - 120	197.0000	N	161.0000		25.2000	143.0	N	P	OK in MSD
Nickel	80 - 120	26.8000		3.6000	J	25.2000	92.0		P	
Potassium	80 - 120	4340.0000		1620.0000		2520.0000	108.0		P	
Silver	75 - 120	2.5900		1.0000		2.5200	102.0		P	
Sodium	80 - 120	10900.0000	N	7860.0000		2520.0000	121.0	N	P	OK in MSD
Vanadium	80 - 120	47.8000		20.8000		25.2000	107.0		P	
Zinc	80 - 120	34.7000		10.7000		25.2000	95.0		P	

N Spike sample recovery is outside control limits.

123

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-3SMI04TT-0211
Lot Number:	G1B160524	**MS Lab Workorder:**	MEHCL - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B160524003D
% Solids	100.0	**QC Batch ID:**	1063112
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	6830.0000	N	6090.0000		100.0000	737.0	N	P	NQ
Antimony	80 - 120	12.3000	N	10.0000		25.1000	47.0	N	P	DNQ
Barium	80 - 120	108.0000		10.9000		100.0000	97.0		P	
Beryllium	80 - 120	2.2000		0.5000		2.5100	88.0		P	
Cadmium	80 - 120	2.3100		0.5000		2.5100	89.0		P	
Calcium	80 - 120	274000.0000	N	259000.0000	B RL	2510.0000	598.0	N	P	NQ
Chromium	80 - 120	23.8000		14.3000		10.0000	94.0		P	
Cobalt	80 - 120	25.6000		2.9000	J	25.1000	91.0		P	
Copper	80 - 120	18.9000		7.3000	J	12.5000	93.0		P	
Iron	80 - 120	7380.0000	N	7170.0000		50.2000	424.0	N	P	NQ
Lead	80 - 120	19.2000	N	5.0000	G	25.1000	77.0	N	P	DNQ
Magnesium	80 - 120	12500.0000		9890.0000		2510.0000	105.0		P	
Manganese	80 - 120	183.0000		161.0000		25.1000	87.0		P	
Nickel	80 - 120	25.9000		3.6000	J	25.1000	89.0		P	
Potassium	80 - 120	4160.0000		1620.0000		2510.0000	101.0		P	
Silver	75 - 120	2.5800		1.0000		2.5100	103.0		P	
Sodium	80 - 120	10600.0000		7860.0000		2510.0000	111.0		P	
Vanadium	80 - 120	45.5000		20.8000		25.1000	99.0		P	
Zinc	80 - 120	32.4000		10.7000		25.1000	87.0		P	

N Spike sample recovery is outside control limits.

124

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	✓
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier)on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

gac
x1corr
4281

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE:** Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form 1's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-3SMI04-0211
Duplicate Sample ID: VEECA-3SMI04T-0211
Triplicate Sample ID: VEECA-3SMI04TT-0211

Water: RSD>30%
Soil: RSD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	7130	4450	6090	1351.15	5890.00	23%
barium	11.9	9.9	10.9	1.00	10.90	9%
beryllium				#DIV/0!	#DIV/0!	#DIV/0!
cadmium				#DIV/0!	#DIV/0!	#DIV/0!
calcium	222000	248000	259000	19000.00	243000.00	8%
chromium	15.7	10.8	14.3	2.52	13.60	19%
cobalt	3.4	1.7	2.9	0.87	2.67	33%
copper	7.9	5.1	7.3	1.47	6.77	22%
iron	8040	5240	7170	1433.05	6816.67	21%
lead				#DIV/0!	#DIV/0!	#DIV/0!
magnesium	9160	9220	9890	405.26	9423.33	4%
manganese	174	117	161	29.87	150.67	20%
nickel	4	2.1	3.6	1.00	3.23	31%
potassium	1770	1220	1620	284.31	1536.67	19%
sodium	7160	6140	7860	864.95	7053.33	12%
vanadium	23.1	14.6	20.8	4.40	19.50	23%
zinc	11.9	7.6	10.7	2.22	10.07	22%
arsenic				#DIV/0!	#DIV/0!	#DIV/0!
thallium				#DIV/0!	#DIV/0!	#DIV/0!
selenium				#DIV/0!	#DIV/0!	#DIV/0!

COMMENTS: No qualifications required. Cobalt >30% RSD but results were <LOQ with one results <LOD.

LAB DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-3SMI04T-0211 (13)
Duplicate Sample ID: VEECA-3SMI04T-0211 (14)

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	4500	4460	1
arsenic			#DIV/0!
barium	10.3	10	3
cadmium			#DIV/0!
calcium	248000	249000	0
chromium	10.8	10.6	2
cobalt	1.9	1.8	5
copper	5.2	5	4
iron	5300	5200	2
lead			#DIV/0!
magnesium	9340	9380	0
manganese	120	118	2
nickel	2.3	2.2	4
potassium	1220	1220	0
selenium			#DIV/0!
sodium	6180	6170	0
vanadium	14.9	14.5	3
zinc	7.8	7.7	1

COMMENTS: Lab designated lab dup - not used to qualify samples - no impact on reported results.

Lab Dup

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI04T-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDV
Matrix:	SOIL	**Lab Sample ID:**	G1B160524013
% Solids:	100.0	**Date/Time Collected:**	02/14/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	4500.0000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	10.3000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	248000.00	B		P
7440-47-3	Chromium	10.8000			P
7440-48-4	Cobalt	1.9000	J		P
7440-50-8	Copper	5.2000	J		P
7439-89-6	Iron	5300.0000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	9340.0000			P
7439-96-5	Manganese	120.0000			P
7440-02-0	Nickel	2.3000	J		P
7440-09-7	Potassium	1220.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	6180.0000			P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	14.9000			P
7440-66-6	Zinc	7.8000	J		P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

Lab Dup

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SMI04T-0211
Lot Number:	G1B160524	**Lab WorkOrder:**	MEHDX
Matrix:	SOIL	**Lab Sample ID:**	G1B160524014
% Solids:	100.0	**Date/Time Collected:**	02/14/11 10:35
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	4460.0000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	3.0000	U		P
7440-39-3	Barium	10.0000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	249000.00	B		P
7440-47-3	Chromium	10.6000			P
7440-48-4	Cobalt	1.8000	J		P
7440-50-8	Copper	5.0000	J		P
7439-89-6	Iron	5200.0000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	9380.0000			P
7439-96-5	Manganese	118.0000			P
7440-02-0	Nickel	2.2000	J		P
7440-09-7	Potassium	1220.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	6170.0000			P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	14.5000			P
7440-66-6	Zinc	7.7000	J		P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			

Field Triplicates were assessed.

A.1.20 **Laboratory Control Sample (LCS) - Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[✓]	___
Between 121% and 150%?	___	[✓]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** NOTE: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

ICP SERIAL DILUTIONS

Lab Name:	TestAmerica West Sacramento	**MS Lab Workorder:**	MEHCLP25
Lot Number:	G1B160524	**MS Lab Sample ID:**	G1B160524003
Matrix:	SOIL	**QC Batch ID:**	1063112
Instrument Id:	T01	**Analysis Date/Time:**	3/4/2011 4:17:33PM
Concentration Units:	UG/L	**Method:**	6010B

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M	
Aluminum	122015.5440		126520.0150		3.69		P	
Antimony	12.9500	U	31.5000	U			P	
Barium	219.3979		222.4999	J	1.41		P	
Beryllium	0.0000	U	-3.2500	U			P	
Cadmium	1.5000	U	2.5000	U			P	
Chromium	286.9928		292.5000		1.92		P	
Cobalt	57.4006		68.2500	J	18.90		P	
Copper	145.4503		167.0000	J	14.82	E	P	NQ
Iron	143650.7280		150502.5042		4.77		P	
Magnesium	198229.6680		210237.4356		6.06		P	
Manganese	3225.2376		3369.0006		4.46		P	
Nickel	72.6991		65.5000	J	9.90		P	
Potassium	32540.9520		32857.5038		0.97		P	
Silver	0.1500	U	-9.0000	U			P	
Sodium	157534.4400		157077.5080		0.29		P	
Vanadium	416.6516		416.7500	J	0.02		P	
Zinc	214.4480		236.7500	J	10.40	E	P	NQ

Both analytes conc. in samples were <50 LOQ so criteria doesn't apply per DOD QSM 4.1 & SAP

		YES	NO	N/A
	when initial concentrations ≥ 50 x ~~MDLs~~. LOQ per DQO QSM 4.1			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___
	Analyte initial conc < 50X LOQ so, criteria doesn't apply			
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓
	ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.			
A.1.23	**Field Blank - Form I** **NOTE**: **Designate "Field Blank" as such on Form I**			
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[___]	✓
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).	clean		
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L, Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	✓	[___]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[✓]	___	___
Was the %RI for the two fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[✓]	___	___

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter

Samples were diluted as necessary due to MI

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags:**
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/14, 2/15
Received Date: 2/16, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/2 soils
Analysis Dates: 3/1 soils; 2/16 waters

All holding time requirements were met with the exception of the two rinse blanks that were submitted as part of this SDG. The reported results were qualified as estimated because they were analyzed approximately 8 hours outside of the 24 hour holding time.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pairs of samples VEECA-3SMI04TT-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.

Sample ID: NONE Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No field duplicate pairs were submitted.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the samples in this SDG. A sample triplicate was performed and assessed. Clarification of the calculations was requested from the laboratory. No additional qualifications to the data were required.

Trip - no + results JAC 42811

Reviewer JACleveland **Date:** 4/28/11

Lab Dup

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04T-0211

General Chemistry

Lot-Sample #...: G1B160524-013 Work Order #...: MEHDV Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137

Dilution Factor: 1 Analysis Time..: 14:30 DL.....: 0.010

JAC 42811

146

Lab Dup

CH2M Hill Inc

Client Sample ID: VEECA-3SMI04T-0211

General Chemistry

Lot-Sample #...: G1B160524-014 Work Order #...: MEHDX Matrix.....: SOLID
Date Sampled...: 02/14/11 10:35 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063137

Dilution Factor: 1 Analysis Time..: 14:31 DL.....: 0.010

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: Grinding Blank

General Chemistry

Lot-Sample #...: G1B160524-015 Work Order #...: ME6EE Matrix.....: WATER
Date Sampled...: 02/28/11 Date Received..: 02/28/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	03/02/11	1063136

Dilution Factor: 1 Analysis Time..: 14:20 DL.....: 2.0

JAC
42811

Hexavalent Chromium Calcs - ICAL soils - 3/2/11

X - Response	Y - Concentration (mg/L)
0	0
0.005	0.005
0.008	0.01
0.019	0.025
0.041	0.05
0.083	0.1

slope, m (A1) =	1.206688155
y-int. (A0) =	0.000292775
r =	0.999635559
Rr2=	0.999271251

VEECA-3SMI04TT-0211 MS Lab Value - 0.260 mg/Kg
Response = 0.043

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0.052180365 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.03
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.259927098 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B170426, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B170426. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-3SB04-001H-0211	G1B170426-001	soil	X	X	X	X	X
VEECA-3SB04-001H-0211 MS	G1B170426-001MS	soil	X	X	X	X	X
VEECA-3SB04-001H-0211 MSD	G1B170426-001MSD	soil	X	X	X	X	X

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- HPLC Performance *
- ICP MS Tuning *
- Initial/Continuing Calibrations *
- ICSA/ICSAB Standards *
- LLQ Standards *
- Blanks *
- Internal Standards *
- Surrogate Recoveries *

- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Duplicate RPDs
- Serial Dilutions
- Field Duplicates NA
- Field Triplicates NA
- Identification/Quantitation
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications required to the data.

Perchlorate

No qualifications required to the data.

Metals

Two analytes exhibited non-compliant RPDs in the matrix duplicate assessment of the MS/MSD pair of sample VEECA-3SB04-001H-0211. Qualifications were required.

The serial dilution analysis exhibited one non-compliant %D that resulted in qualification of the data. Results were qualified as estimated for the non-compliant analyte.

The reported results for the 6010B metals were not corrected for the moisture content of the samples. These results, LODs and LOQs were corrected by the validator in this report. The electronic deliverables file was correct. Please note that it was verified that

MS/MSD recoveries were calculated without moisture correction so the presented recoveries and RPDs were valid. The 6020 results were properly corrected for moisture content by the laboratory and so did not require correction.

Hexavalent Chromium

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/14/11 and samples were received at the laboratory on 2/16/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Matrix Duplicates

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant RPDs for two analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table.

MD	Analytes	Samples	RPD	Q Flag	Q Code
VEECA-3SB04-001H-0211	cadmium	all soil samples	44%	J/UJ	MDP

Serial Dilutions

Metals

The serial dilution submitted in this SDG exhibited a non-compliant %D for one analyte, requiring qualification in the field samples. A summary of this non-compliance and affected samples are noted in the following table.

SD	Analytes	Samples	%D	Q Flag	Q Code
VEECA-3SB04-001H-0211	arsenic	all soil samples	10.3	J/UJ	SD

Identification/Quantitation

Metals

The reported results for the 6010B analytes in sample VEECA-3SB04-001H-0211 were not corrected for percent solids (80%). Therefore, this adjustment has been made by the validator. Results on the form 1 have been adjusted to account for 80% solids. No validation qualifier was required.

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	cadmium	+/-	J/UJ	MDP
all soil samples	arsenic	+/-	J/UJ	SD
VEECA-3SB04-001H-0211	all 6010B analytes	corrected for %Solids	NA	NA

Hexavalent Chromium

Sample ID	Compound	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

CH2M Hill Inc

Client Sample ID: VEECA-3S804-001H-0211

HPLC

Lot-Sample #...: G1B170426-001 Work Order #...: MEH6E1AX Matrix.....: SOLID
Date Sampled...: 02/14/11 08:30 Date Received..: 02/16/11
Prep Date.....: 02/25/11 Analysis Date..: 03/04/11
Prep Batch #...: 1056374 Analysis Time..: 18:58
Dilution Factor: 0.99
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

WM 051111

005

CH2M Hill Inc

Client Sample ID: VEECA-3SB04-001H-0211

HPLC

Lot-Sample #...:	G1B170426-001	**Work Order #...:**	MEH6E1A0	**Matrix.....:**	SOLID
Date Sampled...:	02/14/11 08:30	**Date Received..:**	02/16/11		
Prep Date.....:	03/07/11	**Analysis Date..:**	03/09/11		
Prep Batch #...:	1066377	**Analysis Time..:**	17:53		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.50 U	6.2	ug/kg	0.32

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

016

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-3SB04-001H-0211
Lot Number:	G1B170426	**Lab WorkOrder:**	MEH6E
Matrix:	SOIL	**Lab Sample ID:**	G1B170426001
% Solids:	80.0	**Date/Time Collected:**	02/14/11 8:30
Units:	MG/KG	**Date/Time Received:**	02/16/11 10:10

CAS No.	Analyte		Concentration	C	Q	Method
7429-90-5	Aluminum	1910	~~1530.0000~~			P
7440-36-0	Antimony	2.5	~~2.0000~~	U		P
7440-38-2	Arsenic		1.9000	~~U~~	UJ SD	P
7440-39-3	Barium	10.4	~~8.4000~~			P
7440-41-7	Beryllium	0.13	~~0.1000~~	U		P
7440-43-9	Cadmium	0.063	~~0.0510~~	~~J~~	J MDP	P
7440-70-2	Calcium	338000	~~271000.00~~	~~RLA~~		P
7440-47-3	Chromium	8.2	~~6.5000~~			P
7440-48-4	Cobalt	0.50	~~0.4000~~	J		P
7440-50-8	Copper	3.7	~~3.0000~~			P
7439-89-6	Iron	4660	~~3720.0000~~			P
7439-92-1	Lead	3.1	~~2.5000~~	~~GU~~		P
7439-95-4	Magnesium	10400	~~8350.0000~~			P
7439-96-5	Manganese	56.5	~~45.2000~~			P
7440-02-0	Nickel	1.1	~~0.8500~~	J		P
7440-09-7	Potassium	511	~~409.0000~~			P
7782-49-2	Selenium		1.3000	U		P
7440-22-4	Silver	0.25	~~0.2000~~	U		P
7440-23-5	Sodium	4280	~~3420.0000~~			P
7440-28-0	Thallium		0.1300	U		P
7440-62-2	Vanadium	8.0	~~6.4000~~			P
7440-66-6	Zinc	5.9	~~4.7000~~			P

U Result is less than the reporting limit. (RL)
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JC 42811

Form 1 Analysis Data Sheet Equivalent

011

CH2M Hill Inc

Client Sample ID: VEECA-3SB04-001H-0211

General Chemistry

Lot-Sample #...: G1B170426-001 Work Order #...: MEH6E Matrix.....: SOLID
Date Sampled...: 02/14/11 08:30 Date Received..: 02/16/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	9.6	0.13	--	SW846 9045C	03/01/11	1060380
		Dilution Factor: 1		Analysis Time..: 12:40	DL.....: 0.13	
Hexavalent Chromium	0.031 U	0.063	mg/kg	SW846 7196A	03/07/11	1066348
		Dilution Factor: 1		Analysis Time..: 13:11	DL.....: 0.013	
Percent Moisture	20.0	0.10	%	ASTM D 2216-90	03/01-03/02/11	1060372
		Dilution Factor: 1		Analysis Time..: 09:53	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JC
42811

012

Case Narrative

TestAmerica West Sacramento Project Number G1B170426

General Comments

Please note samples submitted on same date requiring incremental sampling method (ISM) have been reported in lab lot G1B160524.

The temperature blank was received at the lab at 0 degrees and the sample at 1 degree Celsius with wet ice used as a cooling agent

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

SOLID, 6850/DOD Handbook, Perchlorate
Sample: 1
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MFAE31AC
SMCS: MFAE31AD

SOLID, 6010B, Metals
Sample: 1
The recoveries for aluminum, cadmium, calcium and iron are outside the established control limits for the matrix spike and/or matrix spike duplicate (MS/MSD) associated with this batch. Also the analytes cadmium and silver exceed the relative percent difference (RPD) for the MS/MSD. The concentrations of aluminum, calcium and iron in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

SOLID, 7196A, Hexavalent Chromium
Sample: 1
The method blank associated with this extraction batch has hexavalent chromium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

Case Narrative

TestAmerica West Sacramento Project Number G1B170426

There are no other anomalies associated with this project.

Sample Summary

TestAmerica West Sacramento Project Number G1B170426

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEH6E	1	VEECA-3SB04-001H-0211	2/14/2011 08:30 AM	2/16/2011 10:10 AM

Notes:

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B170426

Cooler 1 G1B170426
~~G1B160524~~ 2/16/11

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.F1.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 5736 9313 4149

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Stephen Brunt Stephen Brunt
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not intact

Analysis and Container Type, Preservatives

Sample Description	Date/Time Collected	Matrix (sq, sd, ss, sb)	No. of Containers	EXPLO (83308 List at Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) test for explosives	EXPLO (83308 List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (83308 list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8550 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
				4°C, headspace			4°C, headspace				None	4°C	Acid filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
VEECA-3SB04-001H-0211	02-14-11 0830	sb	1				1													
VEECA-3SB04-001H-0211-MS	02-14-11 0830	sb	1				1													
VEECA-3SB04-001H-0211-SD	02-14-11 0830	sb	1				1													
~~VEECA-SGM01-0211~~	~~02-14-11 1000~~	~~GM~~	~~3~~		~~3~~															
~~VEECA-SGM02-0211~~	~~02-14-11 0900~~	~~GM~~	~~3~~		~~3~~															
~~VEECA-4SM08-0211~~	~~02-14-11 1350~~	~~GM~~	~~3~~		~~3~~															

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
Stephen Brunt	2/15/11 1700	Cheng Chu	02/16/11 - 1135			
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 374-4400

11/9/2011 1550
1 1550
1 1550

016

2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M Hill PM KS LOG # 69358

LOT# (QUANTIMS ID) G1B170426 QUOTE# 88113 LOCATION W12D

Checked (✓)

DATE RECEIVED 02/16/11 TIME RECEIVED 1010 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 602471, 602473

COC #(S) NA ☑

TEMPERATURE BLANK Observed: -1 Corrected: 0

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: 0, 0, 1 Average 0 Corrected Average 1

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

Initials: CV Date: 02/16/11

==========

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH ☑ N/A ☑
APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)[1] ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: CV Date: 02/17/11

Notes

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

017

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B170426

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ	3																			
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B170426

LAB: Test America- West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [ ] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ ✓ ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

S-2/14 P-2/25
R-2/16 A-3/4

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

a. Water/Waste listed on Form 1 [ ] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

a. Water listed on Form 1 [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
___out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VEECA-EB02-021511-DSS MO

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro RP C18

column 2: Synergi Hydro RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? ___ ✓ ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ✓ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ✓ ___ ___

w/in 1 min

032

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). ✓ ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? ✓ ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence ✓ ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] ✓ ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided W/ daily RTW Data Validator checked Ccal in sequence and compared RT to check stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [ ] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

NOTE

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate →
not submitted for this data pkg

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

046

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

041

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	6:06				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.16	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27	MB 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28								
29								
30								
31								

mr 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/14/11
Received Date: 2/16/11
Prep Date: 3/7/11
Analysis Dates: 3/9/11
Cooler Temp: 1°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

No contamination was noted in the method and/or grinding blanks - no qualifications required. Associated QC blanks were: VEECA-EB02-021511-DSS (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for VEECA-3SB04-001H-0211-all criteria met.

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer _____ **Date:** 4/21/11

GIB170426

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]		✓

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments? (values present not validated)	✓		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓
Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:			
Legible?	✓		
Properly labeled?	✓		
Are all field samples, QC samples and field QC samples present on:			
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1	Cyanide distillation(14 days)exceeded?		[ ]	✓
	Mercury analysis(28 days) exceeded?		[ ]	✓
	Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

Metals Analysis ≤ 2?	[ ]		✓
Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°? [✓]

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B170426

2/18, 1430

ICP - AES	
SAMPLE ID	VEECA-3SB04-001H-0211
ANALYTE	vanadium
Lab Value CONCENTRATION (mg/Kg)	6.4
AMOUNT FROM RAW DATA (ug/ml)	0.063179
SAMPLE SIZE (g)	0.99
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.8
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	7.977

Note - all 6010 results need to be corrected for moisture content!

2/22, 2049

ICP-MS	
SAMPLE ID	VEECA-3SB04-001H-0211MS
ANALYTE	thallium
Lab Value CONCENTRATION (mg/Kg)	5.05
AMOUNT FROM RAW DATA (ug/L)	41.186042
SAMPLE SIZE (g)	1.02
FINAL VOLUME (L)	0.1
DILUTION FACTOR	1
DRYNESS FACTOR	0.8
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	5.04731

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

* Reviewer corrected SOIL results for moisture as lab did not!

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were performed as necessary but this is not included on Form I's.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES (more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

		YES	NO	N/A
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

		YES	NO	N/A
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	___	___
Hg - 80-120%R?	[___]	___	___
Cyanide - 85-115%R?	[___]	___	___

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

see following page for any necessary quals

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ___

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

		02/18/11 16:14 ICV4 Found	%REC	02/18/11 16:16 ICV2A Found	%REC
Magnesium	10000	9870.9	98.7		
Manganese	0				
	1000	1032.1	103.2		
Nickel	0				
	1000	1031.3	103.1		
Potassium	0			114.90	0.0
	10000	9953.4	99.5		
Silver	0				
	250	242.83	97.1		
Sodium	10000	11703	117.0		
	25000			25660	102.6
Vanadium	0				
	1000	978.23	97.8		
Zinc	0			1.91	0.0
	1000	1003.8	100.4		

NQ - Sample result reported from prev. ICAL run

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? LLQS std. (Note: CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

analyzed at frequency per lab SOP/method

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B170553_LLQS.pdf; G1B170426_LLQS.pdf; G1B120440_LLQS.pdf; G1B120421_LLQS.pdf; G1B110556_LLQS.pdf

Hi Jackie,
Attached are the next 5 files of data for this project.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTEN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/A
A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[___]	___	✓

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

no qnals were required

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	02/26/11 18:19 CCB 13	02/26/11 18:48 CCB 14	02/26/11 18:54 CCB 15
Selenium	3.0 U	3.0 U	3.0 U

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	02/26/11 19:20 CCB 16	02/26/11 19:26 CCB 17	02/26/11 19:56 CCB 18
Selenium	3.0 U	3.0 U	3.0 U

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	02/26/11 20:02 CCB 19	02/26/11 20:25 CCB 20	02/26/11 20:31 CCB 21
Selenium	3.0 U	3	3.0 U

NQ - no samples assoc

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110226A1

Analyte	02/26/11 20:55 CCB 22
Selenium	3.0 U

U Result is less than the reporting limit (RL)

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228A1A

Analyte	02/28/11 10:26 CCB 1	02/28/11 10:33 CCB 2	02/28/11 11:15 CCB 3
Selenium	3.0 U	3.0 U	3.0 U

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228A1A

Analyte	02/28/11 11:22 CCB 4	02/28/11 11:53 CCB 5	02/28/11 12:04 CCB 6
Selenium	3.0 U	3	3.0 U

NQ - no samples assoc

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228A1A

Analyte	02/28/11 12:31 CCB 7	02/28/11 12:39 CCB 8	02/28/11 13:03 CCB 9
Selenium	3.0 U	3.0 U	3.0 U

Lot Number: G1B170426 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110228A1A

Analyte	02/28/11 13:13 CCB 10	02/28/11 13:43 CCB 11
Selenium	3.0 U	3.0 U

U Result is less than the reporting limit (RL)

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE:The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[___]	___	___
Each matrix type?	[___]	___	___
All instruments used for metals and cyanide analyses?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

$\geq$ MDL but $\leq$ CRQL, and

$>$ CRQL

	YES	NO	N/A
A.1.15.2.1 When MDL < CRQL, is any preparation blank value $\geq$ MDL but $\leq$ CRQL?	___	[✓]	___

ACTION:
If yes, change sample result $\geq$ MDL

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

067

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			

A.1.16 **ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV**

NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg.

A.1.16.1	Present and complete?	[✓]		
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples? @ beginning only	[✓]		
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]		
	ACTION: If no, flag as estimated (J) all sample results.			

A.1.16.2 **ICP-AES Method**

A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]		
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[ ]		✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[___]	___	___
	On one of the SDG samples?	[___]	___	___
	For each concentration range (i.e., low, med., high)?	[___]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[___]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form 1's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[✓]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	___
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

no waters

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(NOTE:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	___	[✓]	___
(c) between 126-200%?	✓	[✓]	___
(d) greater than 200%?	✓	[___]	___

x1 corr JAC 42811

ACTION:
If yes for any of the above, proceed as follows:

Results out due to abundance - see next pages for more info.

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(NOTE:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

For each SDG?	[✓]	___	___
On one of the SDG samples?	[✓]	___	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD RPD's calc

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-3SB04-001H-0211
Lot Number:	G1B170426	**MS Lab Workorder:**	MEH6E - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B170426001S
% Solids	80.0	**QC Batch ID:**	1049167
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M
Aluminum	80 - 120	2030.0000	N	1530.0000		194.0000	258.0	N	P
Antimony	80 - 120	45.9000		2.0000		48.5000	93.0		P
Barium	80 - 120	204.0000		8.4000		194.0000	101.0		P
Beryllium	80 - 120	4.3100		0.1000		4.8500	89.0		P
Cadmium	80 - 120	4.4600		0.0510	J	4.8500	91.0		P
Calcium	80 - 120	284000.0000	N	271000.0000	RLA	5050.0000	274.0	N	P
Chromium	80 - 120	24.9000		6.5000		19.4000	95.0		P
Cobalt	80 - 120	44.3000		0.4000	J	48.5000	90.0		P
Copper	80 - 120	27.7000		3.0000		24.3000	102.0		P
Iron	80 - 120	3810.0000		3720.0000		97.1000	88.0		P
Lead	80 - 120	47.3000		2.5000	G	50.5000	94.0		P
Magnesium	80 - 120	12400.0000		8350.0000		4850.0000	84.0		P
Manganese	80 - 120	92.8000		45.2000		48.5000	98.0		P
Nickel	80 - 120	44.6000		0.8500	J	48.5000	90.0		P
Potassium	80 - 120	5460.0000		409.0000		4850.0000	104.0		P
Silver	75 - 120	4.4800		0.2000		4.8500	92.0		P
Sodium	80 - 120	8360.0000		3420.0000		4850.0000	102.0		P
Vanadium	80 - 120	53.5000		6.4000		48.5000	97.0		P
Zinc	80 - 120	45.7000		4.7000		48.5000	85.0		P

*NQ

*NQ

N Spike sample recovery is outside control limits.

* out due to abundance
No Quals

073

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-3SB04-001H-0211
Lot Number:	G1B170426	**MS Lab Workorder:**	MEH6E - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B170426001D
% Solids	80.0	**QC Batch ID:**	1049167
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	2170.0000	N	1530.0000		208.0000	307.0	N	P	NQ*
Antimony	80 - 120	49.6000		2.0000		52.1000	94.0		P	
Barium	80 - 120	220.0000		8.4000		208.0000	102.0		P	
Beryllium	80 - 120	4.6100		0.1000		5.2100	88.0		P	
Cadmium	80 - 120	6.9900	N *	0.0510	J	5.2100	133.0	N	P	NQ MS ok
Calcium	80 - 120	293000.0000	N	271000.0000	RLA	5050.0000	444.0	N	P	NQ*
Chromium	80 - 120	26.6000		6.5000		20.8000	96.0		P	
Cobalt	80 - 120	47.9000		0.4000	J	52.1000	91.0		P	
Copper	80 - 120	29.7000		3.0000		26.0000	103.0		P	
Iron	80 - 120	4150.0000	N	3720.0000		104.0000	407.0	N	P	NQ*
Lead	80 - 120	46.0000		2.5000	G	50.5000	91.0		P	
Magnesium	80 - 120	13600.0000		8350.0000		5210.0000	100.0		P	
Manganese	80 - 120	98.5000		45.2000		52.1000	102.0		P	
Nickel	80 - 120	48.2000		0.8500	J	52.1000	91.0		P	
Potassium	80 - 120	5880.0000		409.0000		5210.0000	105.0		P	
Silver	75 - 120	5.6200	*	0.2000		5.2100	108.0		P	
Sodium	80 - 120	9090.0000		3420.0000		5210.0000	109.0		P	
Vanadium	80 - 120	56.5000		6.4000		52.1000	96.0		P	
Zinc	80 - 120	48.6000		4.7000		52.1000	84.0		P	

Relative percent difference (RPD) is outside stated control limits.

N Spike sample recovery is outside control limits.

* out due to abundance

074

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	✓
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[✓]	✓
is any RPD ≥ 100%?	___	[.]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**: Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	✓	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

JAC 42811 see following page for goals.

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

076

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B170426 **Matrix.....:** SOLID
Date Sampled...: 02/14/11 08:30 **Date Received..:** 02/16/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: G1B170426-001 **Prep Batch #...:** 1049163							
Arsenic	100	(80 - 120)			SW846 6020	02/18-02/26/11	MEH6E1A9
	94	(80 - 120)	4.7	(0-20)	SW846 6020	02/18-02/26/11	MEH6E1CA
		Dilution Factor: 5					
		Analysis Time..: 20:46					
Selenium	93	(80 - 120)			SW846 6020	02/18-02/28/11	MEH6E1CC
	98	(80 - 120)	6.9	(0-20)	SW846 6020	02/18-02/28/11	MEH6E1CD
		Dilution Factor: 5					
		Analysis Time..: 13:33					
Thallium	82	(80 - 120)			SW846 6020	02/18-02/22/11	MEH6E1CE
	88	(80 - 120)	8.1	(0-20)	SW846 6020	02/18-02/22/11	MEH6E1CF
		Dilution Factor: 1					
		Analysis Time..: 20:49					
MS Lot-Sample #: G1B170426-001 **Prep Batch #...:** 1049167							
Aluminum	258 N	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CL
	307 N	(80 - 120)	6.6	(0-20)	SW846 6010B	02/18/11	MEH6E1CM
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Antimony	93	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DL
	94	(80 - 120)	7.9	(0-20)	SW846 6010B	02/18/11	MEH6E1DM
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Barium	101	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CN
	102	(80 - 120)	7.4	(0-20)	SW846 6010B	02/18/11	MEH6E1CP
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Beryllium	89	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CQ
	88	(80 - 120)	6.7	(0-20)	SW846 6010B	02/18/11	MEH6E1CR
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Cadmium	91	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CV
	133 N,*	(80 - 120)	44	(0-20)	SW846 6010B	02/18/11	MEH6E1CW
		Dilution Factor: 1					
		Analysis Time..: 14:38					

JMS

(Continued on next page)

077

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B170426 **Matrix.....:** SOLID
Date Sampled...: 02/14/11 08:30 **Date Received..:** 02/16/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Calcium	274 N	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CT
	444 N	(80 - 120)	3.0	(0-20)	SW846 6010B	02/18/11	MEH6E1CU
		Dilution Factor: 5					
		Analysis Time..: 16:54					
Chromium	95	(80 - 120)			SW846 6010B	02/18/11	MEH6E1C1
	96	(80 - 120)	6.4	(0-20)	SW846 6010B	02/18/11	MEH6E1C2
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Cobalt	90	(80 - 120)			SW846 6010B	02/18/11	MEH6E1CX
	91	(80 - 120)	7.9	(0-20)	SW846 6010B	02/18/11	MEH6E1C0
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Copper	102	(80 - 120)			SW846 6010B	02/18/11	MEH6E1C3
	103	(80 - 120)	7.1	(0-20)	SW846 6010B	02/18/11	MEH6E1C4
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Iron	88	(80 - 120)			SW846 6010B	02/18/11	MEH6E1C5
	407 N	(80 - 120)	8.5	(0-20)	SW846 6010B	02/18/11	MEH6E1C6
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Lead	94	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DJ
	91	(80 - 120)	2.9	(0-20)	SW846 6010B	02/18/11	MEH6E1DK
		Dilution Factor: 5					
		Analysis Time..: 16:54					
Magnesium	84	(80 - 120)			SW846 6010B	02/18/11	MEH6E1C9
	100	(80 - 120)	8.7	(0-20)	SW846 6010B	02/18/11	MEH6E1DA
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Manganese	98	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DC
	102	(80 - 120)	5.9	(0-20)	SW846 6010B	02/18/11	MEH6E1DD
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Nickel	90	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DG
	91	(80 - 120)	7.8	(0-20)	SW846 6010B	02/18/11	MEH6E1DH
		Dilution Factor: 1					
		Analysis Time..: 14:38					

(Continued on next page)

078

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: G1B170426 **Matrix.....:** SOLID
Date Sampled...: 02/14/11 08:30 **Date Received..:** 02/16/11

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Potassium	104	(80 - 120)			SW846 6010B	02/18/11	MEH6E1C7
	105	(80 - 120)	7.3	(0-20)	SW846 6010B	02/18/11	MEH6E1C8
		Dilution Factor: 1					
		Analysis Time..: 14:38					
					-No Quals - <35% so no action reqd		
Silver	92	(75 - 120)			SW846 6010B	02/18/11	MEH6E1CJ
	108 *	(75 - 120)	23	(0-20)	SW846 6010B	02/18/11	MEH6E1CK
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Sodium	102	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DE
	109	(80 - 120)	8.4	(0-20)	SW846 6010B	02/18/11	MEH6E1DF
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Vanadium	97	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DN
	96	(80 - 120)	5.6	(0-20)	SW846 6010B	02/18/11	MEH6E1DP
		Dilution Factor: 1					
		Analysis Time..: 14:38					
Zinc	85	(80 - 120)			SW846 6010B	02/18/11	MEH6E1DQ
	84	(80 - 120)	6.0	(0-20)	SW846 6010B	02/18/11	MEH6E1DR
		Dilution Factor: 1					
		Analysis Time..: 14:38					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

* Relative percent difference (RPD) is outside stated control limits.

N Spiked analyte recovery is outside stated control limits.

Results and reporting limits have been adjusted for dry weight.

075

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5	Circle on each Appendix A.4 all values that have: RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS) - Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A

more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

Less than 50%?	___	[___]	✓
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[___]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

TAL West Sac

SERIAL DILUTION

Method: 6010 | Thermo6010 | Reported: 02/22/11 11:39:38

Department: 120 (Metals) | Source: MetEdit

Sample: **MEH6EP5** | Serial Dilution: **5.00** | Sample Dilution: **1.00**

Instrument: **Thermo 6500 Duo**
File: 021811 # 116
Acquired: 02/18/2011 14:33:17
Calibrated: 02/18/2011 09:52:17

Channel 273
Method 6010T
Thermo6010

Matrix SOLID
Units: ppm

CASN	Analyte Name	M/S	Area	Dilution	Sample	%Diff.	MDL	Flag	Q
7440-22-4	Silver	328	0	0.00060	-0.00050		0.00090	NC	☑
7429-90-5	Aluminum	309	3	14.770	14.793	0.155	0.056	0.2	☑
7429-90-5	Aluminum	396	3	14.901	15.136	1.56	0.056	1.6	☑
7440-38-2	Arsenic	189	0	0.02990	0.03094	3.36	0.013	NC	☑
7440-42-8	Boron	209	0	0.16925	0.16225	4.31		*	
7440-39-3	Barium	455	0	0.08240	0.08267	0.327	0.0012	0.3	☑
7440-41-7	Beryllium	313	-0	-0.00140	-0.00111		0.00030	NC	☑
7440-70-2	Calcium	318	515	2572.6	2261.2	13.8	0.045	E	☐
7440-43-9	Cadmium	214		0	0		0.00030	NC	☑
7440-43-9	Cadmium	229	0	0.00100	0.00050	100	0.00030	NC	☑
7440-48-4	Cobalt	229	0	0.00510	0.00396	28.8	0.0025	NC	☑
7440-47-3	Chromium	268	0	0.06900	0.06470	6.65	0.0014	NC	☑
7440-50-8	Copper	325	0	0.03205	0.02943	8.90	0.0022	NC	☑
7439-89-6	Iron	260	8	38.368	36.873	4.05	0.011	4.1	☑
7440-09-7	Potassium	766	1	3.9297	4.0472	2.90	0.10	NC	☑
7439-95-4	Magnesium	279	18	87.905	82.665	6.34	0.045	6.3	☑
7439-96-5	Manganese	258	0	0.47095	0.44717	5.32	0.0025	5.3	☑
7439-98-7	Molybdenum	202	0	0.00175	0.00182	3.85	0.0075	NC	☑
7440-23-5	Sodium	590	7	32.939	33.865	2.73	0.11	2.7	☑
7440-02-0	Nickel	232	0	0.00795	0.00837	5.02	0.0024	NC	☑
7439-92-1	Lead	220	-0	-0.02215	-0.02174		0.0026	NC	☑
7440-36-0	Antimony	207	0	0.01445	0.00673	115	0.0094	NC	☑
7782-49-2	Selenium	196	-0	-0.00850	-0.00435		0.014	NC	☑
7440-31-5	Tin	190	0	0.00855	0.01010	15.3		*	
7440-24-6	Strontium	408	6	30.107	28.265	6.52		*	
7440-32-6	Titanium	335	0	0.16030	0.16383	2.15		*	
7440-28-0	Thallium	191	0	0.00475	0.00079	501	0.0084	NC	☑
7440-62-2	Vanadium	292	0	0.06315	0.06318	0.0475	0.0019	NC	☑
7440-21-3	Silicon	288	0	1.9727	2.0772	5.03		*	
7440-66-6	Zinc	206	0	0.04995	0.04661	7.17	0.0019	NC	☑
7723-14-0	Phosphorus	178	2	11.422	11.510	0.769		*	
7704-34-9	Sulfur	182	3	12.833	13.238	3.06		*	

NQ - results < 50X LOQ so criteria do not apply

CASN	ISTD Name	M/S	Area	Amount	Q
7440-65-5	Y	224	9304		☑
7440-65-5	Y	360	88142		☑
7440-65-5	Y	377	20965		☑

* Analyte not requested for this batch, no MDL

NC : Serial dilution concentration < 50 X MDL

E : Difference greater than Limit (10%)

Reviewed by: | Date:

IDB Reports | TestAmerica, Inc. | Version: 6.02.088

View Page 1 of 1

086

TAL West Sac

SERIAL DILUTION

Method: 6010 | Thermo6010 | Reported: 02/22/11 08:36:46

Department: 120 (Metals) | Source: MetEdit

Sample: **MEH6EP25** | Serial Dilution: **25.00** | Sample Dilution: **5.00**

Instrument: **Thermo 6500 Duo** | Channel 273
File: 021811B # 21 | Method 6010T
Acquired: 02/18/2011 16:49:25 | Thermo6010 | Matrix: SOLID
Calibrated: 02/18/2011 15:59:13 | Units: ppm

CASN	Analyte Name	M/S	Area	Dilution	Sample	%Diff.	MDL	Flag	Q
7440-22-4	Silver	328	0	0.00350	0.00230	52.2	0.00090	NC	☑
7429-90-5	Aluminum	396	1	14.961	14.988	0.182	0.056	0.2	☑
7440-38-2	Arsenic	189	0	0.06800	0.02940	131	0.013	NC	☑
7440-42-8	Boron	209	0	0.17550	0.17000	3.24		*	
7440-39-3	Barium	455	0	0.08125	0.08295	2.05	0.0012	2.0	☑
7440-41-7	Beryllium	313	-0	-0.00225	-0.00145		0.00030	NC	☑
7440-70-2	Calcium	318	111	2764.3	2679.1	3.18	0.045	3.2	☑
7440-43-9	Cadmium	214	0	0.00250	0.00050	400	0.00030	NC	☑
7440-43-9	Cadmium	229	0	0.00250	0.00050	400	0.00030	NC	☑
7440-48-4	Cobalt	229	0	0.00300	0.00405	26.9	0.0025	NC	☑
7440-47-3	Chromium	268	0	0.07750	0.06900	12.3	0.0014	E	☐
7440-50-8	Copper	325	0	0.03125	0.03215	2.80	0.0022	NC	☑
7439-89-6	Iron	260	2	40.442	39.596	2.14	0.011	2.1	☑
7440-09-7	Potassium	766	0	4.4893	4.0583	10.6	0.10	NC	☑
7439-95-4	Magnesium	279	4	96.500	92.195	4.67	0.045	4.7	☑
7439-96-5	Manganese	258	0	0.49350	0.48075	2.65	0.0025	2.7	☑
7439-98-7	Molybdenum	202	-0	-0.00125	0.00160	178	0.0075	NC	☑
7440-23-5	Sodium	590	1	32.895	33.394	1.49	0.11	1.5	☑
7440-02-0	Nickel	232	0	0.01600	0.01075	48.8	0.0024	NC	☑
7439-92-1	Lead	220	-0	-0.02825	-0.02535		0.0026	NC	☑
7440-36-0	Antimony	207	-0	-0.02100	-0.00975		0.0094	NC	☑
7782-49-2	Selenium	196	-0	-0.04175	-0.01705		0.014	NC	☑
7440-31-5	Tin	190	0	0.00500	0.00800	37.5		*	
7440-24-6	Strontium	408	1	29.965	29.457	1.72		*	
7440-32-6	Titanium	335	0	0.13800	0.15775	12.5		*	
7440-28-0	Thallium	191	0	0.01900	0.00920	107	0.0084	NC	☑
7440-62-2	Vanadium	292	0	0.05500	0.06505	15.4	0.0019	NC	☑
7440-21-3	Silicon	288	0	2.1958	2.1682	1.27		*	
7440-66-6	Zinc	206	0	0.06725	0.05575	20.6	0.0019	NC	☑
7723-14-0	Phosphorus	178	0	11.027	11.310	2.50		*	
7704-34-9	Sulfur	182	0	11.957	12.325	2.98		*	
7429-90-5	Aluminum			0	14.942	100	0.056	NC	☑

CASN	ISTD Name	M/S	Area	Amount	Q
7440-65-5	Y	224	9615		☑
7440-65-5	Y	360	91355		☑
7440-65-5	Y	377	20590		☑

No Quals - results < 50 X LOQ so criteria does not apply

* Analyte not requested for this batch, no MDL

NC : Serial dilution concentration < 50 X MDL

E : Difference greater than Limit (10%)

Reviewed by: | Date:

		YES	NO	N/A
	when initial concentrations ≥ 50 x ~~MDLs~~ LOQ - per DQQSM4.1/SAP.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	[___]	___

ACTION:
If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.21.4 Are any %D values:

Ca & Cr - NQ results <50X LOQ
As - flagged JHJ

	YES	NO	N/A
> 10%?	✓	[___]	___
≥ 100%?	___	[✓]	___

ACTION:
If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.

(**NOTE**:Replace "E" with "J" or "R" as appropriate.)

A.1.22 **Total/Dissolved or Inorganic/Total Analytes**

	YES	NO	N/A
A.1.22.1 Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓

ACTION:
If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled:

(1) The dissolved(or inorganic)concentration is greater than total concentration, and
(2) greater than or equal to 5xMDL.

	YES	NO	N/A
A.1.22.2 Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	___

TAL West Sac

SERIAL DILUTION

Method: 6020 (SOP: SAC-MT-001) M02 Reported: 02/23/11 12:12:36

Department: 120 (Metals) Source: MetEdit

Sample: **MEAF0P5** Serial Dilution: **5.00** Sample Dilution: **1.00**

Instrument: **ICPMS M02** Channel 262
File: 110222B2 # 96 Method 6020_
Acquired: 02/22/2011 19:51:05 M02 Matrix: SOLID
Calibrated: 02/22/2011 19:13:17 Units: ug/L

CASN	Analyte Name	M/S	Area	Dilution	Sample	%Diff.	MDL	Flag	Q
7440-38-2	Arsenic	75	31017	249.25	226.04	10.3	1.5	E	☐ JTWJ
7782-49-2	Selenium	82	1015	22.880	13.383	71.0	1.0	NC	☑
7440-28-0	Thallium	205	2279	0.89352	2.4153	63.0	0.50	NC	☑

CASN	ISTD Name	M/S	Area	Amount	Q
7440-56-4	Germanium	72	673754		☐
7440-30-4	Thulium	169	432841		☐

* Analyte not requested for this batch, no MDL

NC : Serial dilution concentration < 100 X MDL

E : Difference greater than Limit (10%)

Reviewed by: Date:

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: Designate "Field Blank" as such on Form I

		YES	NO	N/A
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

096

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

Dilutions were performed so all results were within LR

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 per SAP of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted ~~two fold~~ 1:5 per SAP, Internal Standard added and the sample re-analyzed?	[✓]	___	___
Was the %RI for the ~~two fold~~ 1:5 per SAP diluted sample within the acceptance limits (60-125%)?	[✓]	___	___

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ (✓) ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/14
Received Date: 2/16, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/7 soils
Analysis Dates: 3/7 soils

All holding time requirements were met. No qualifications were required.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pairs of samples VEECA-3SB04-001H-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No field duplicate pairs were submitted.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the sample in this SDG. Clarification of the calculations was requested from the laboratory. No additional qualifications to the data were required.

Reviewer JCleveland **Date:** 4/28/11

Hexavalent Chromium Calcs - ICAL soils - 3/7/11

X - Response	Y - Concentration (mg/L)
0	0
0.004	0.005
0.009	0.01
0.021	0.025
0.041	0.05
0.083	0.1

slope, m (A1) =	1.209068859
y-int, (A0) =	-0.000172147
r =	0.999924897
Rr2=	0.9998498

VEECA-3SB04-001H-0211 M Lab Value - 0.285 mg/Kg

Response = 0.038

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.04577247 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.02
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	0.8
Concentration =	0.285364526 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B170553, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B170553. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-4SMI09-0211	G1B170553-001	soil	X	X	X	X	X
VEECA-4SMI09T-0211	G1B170553-002	soil	X	X	X	X	X
VEECA-4SMI09TT-0211	G1B170553-003	soil	X	X	X	X	X
VEECA-4SMI04-0211	G1B170553-004	soil	X	X	X	X	X
VEECA-4SMI06-0211	G1B170553-005	soil	X	X	X	X	X
VEECA-4SMI07-0211	G1B170553-006	soil	X	X	X	X	X
VEECA-4SMI10-0211	G1B170553-007	soil	X	X	X	X	X
VEECA-EB01-021611-SMI	G1B170553-010	water	X	X	X	X	X
VEECA-4SMI04-0211 MS	G1B170553-004MS	soil	X	X	X	X	X
VEECA-4SMI04-0211 MSD	G1B170553-004MSD	soil	X	X	X	X	X

The following quality control samples were provided with this SDG: sample VEECA-EB01-021611-SMI-equipment blank; and samples VEECA-4SMI09T-0211 and VEECA-4SMI09TT-0211- field triplicate sample of sample VEECA-4SMI09-0211.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

One sample reported positive results required qualification based on column quantitation %Ds greater than 40%.

Perchlorate

No qualifications to the data were required.

Metals

The associated ICV standard exhibited a high recovery for sodium. The reported positive result for sodium in the field sample was qualified as estimated J.

The associated grinding blank exhibited contamination that resulted in qualifications to the sample results.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Qualifications to the data were required.

Hexavalent Chromium

One sample exceeded the required 24-hour holding time; therefore the reported result was qualified as estimated.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows and Form Xs were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/15-16/11 and samples were received at the laboratory on 2/17/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements with the following exceptions.

Hexavalent Chromium

Sample VEECA-EB01-021611-SM1 exceeded the 24 hour holding time by approximately 4 hours. The reported non-detect result was qualified as estimated UJ with a qualifier code of HT.

Initial/Continuing Calibrations

The associated ICV analyzed 3/3/11 at 16:47 exhibited a recovery for sodium that was above the upper QC limit of 110% at 116.8a. Therefore, in all soil samples, the reported positive results for sodium were qualified as estimated J with a qualifier code of CCH.

Blanks

Metals

The associated grinding blank exhibited contamination as noted in the following table. *Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.*

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B170553011	selenium sodium	13.1J ug/L/ 0.655 mg/Kg 1220 ug/L/61 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg

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

Sample ID	Analyte	Q Flag	Q Code
all soil samples	selenium sodium	J	GBL

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SMI04-0211	antimony	all soil samples	27/29	J/UJ	MSL
	manganese		173/161	J	MSH

Identification/Quantitation

Explosives

Qualifications were required in the samples due to high (>40%) column quantitation %Ds. Region II guidelines were followed in applying these qualifications. Sample results were flagged as noted in the following table below.

Sample ID	Compound	Column Quant %D	Qualifier	Q Code
VEECA-4SMI07-0211	2,4,6-trinitrotoluene	109	NJ	2C

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
VEECA-4SMI07-0211	2,4,6-trinitrotoluene	+	NJ	2C

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	sodium	+	J	CCH
all soil samples	selenium	+	J	GBL
all soil samples	sodium*	+	J	GBL
all soil samples	antimony	+/-	J/UJ	MSL
all soil samples	manganese	+	J	MSH

**The final qualifier code for sodium in the samples is CCH*

Hexavalent Chromium

Sample ID	Compound	Results	Q flag	Q Code
VEECA-EB01-021611-SMI	hexavalent chromium	+	J	HT

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

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09-0211

HPLC

Lot-Sample #...: G1B170553-001 Work Order #...: MEJ8E1AX Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 00:14
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	101	(81 - 127)

WM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09T-0211

HPLC

Lot-Sample #...: G1B170553-002 Work Order #...: MEJ8G1A5 Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 01:44
Dilution Factor: 0.97

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	29 U	240	ug/kg	8.5
1,3,5-Trinitrobenzene	29 U	240	ug/kg	9.7
1,3-Dinitrobenzene	29 U	240	ug/kg	4.1
2,4,6-Trinitrotoluene	29 U	240	ug/kg	19
2,4-Dinitrotoluene	29 U	240	ug/kg	5.1
2,6-Dinitrotoluene	29 U	240	ug/kg	7.1
2-Amino-4,6-dinitrotoluene	29 U	240	ug/kg	12
2-Nitrotoluene	29 U	240	ug/kg	13
3-Nitrotoluene	29 U	240	ug/kg	15
4-Amino-2,6-dinitrotoluene	29 U	240	ug/kg	9.7
4-Nitrotoluene	29 U	240	ug/kg	18
HMX	29 U	240	ug/kg	12
Nitrobenzene	29 U	240	ug/kg	17
Nitroglycerin	58 U	480	ug/kg	15
PETN	58 U	480	ug/kg	24
RDX	29 U	240	ug/kg	12
Tetryl	29 U	240	ug/kg	9.7

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	112	(81 - 127)

MM 05/11/11

011

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09TT-0211

HPLC

Lot-Sample #...: G1B170553-003 Work Order #...: MEJ8H1AG Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 02:29
Dilution Factor: 1.01
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	105	(81 - 127)

MM 05/11/11

012

CH2M Hill Inc

Client Sample ID: VEECA-4SMI04-0211

HPLC

Lot-Sample #...: G1B170553-004 Work Order #...: MEJ8J1A5 Matrix.....: SOLID
Date Sampled...: 02/15/11 11:40 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 03:14
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	103	(81 - 127)

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-4SMI06-0211

HPLC

Lot-Sample #...: G1B170553-005 Work Order #...: MEJ8V1A6 Matrix.....: SOLID
Date Sampled...: 02/15/11 10:45 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 05:30
Dilution Factor: 1.01

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.9
1,3,5-Trinitrobenzene	30 U	250	ug/kg	10
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	20
2,4-Dinitrotoluene	30 U	250	ug/kg	5.4
2,6-Dinitrotoluene	30 U	250	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	13
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	16
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	10
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	18
Nitroglycerin	61 U	500	ug/kg	15
PETN	61 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	112	(81 - 127)

WM 05/11/11

U14

CH2M Hill Inc

Client Sample ID: VEECA-4SMI07-0211

HPLC

Lot-Sample #...: G1B170553-006 Work Order #...: MEJ8X1A6 Matrix.....: SOLID
Date Sampled...: 02/15/11 12:55 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 06:15
Dilution Factor: 1.02

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	31 U	260	ug/kg	9.0
1,3,5-Trinitrobenzene	31 U	260	ug/kg	10
1,3-Dinitrobenzene	31 U	260	ug/kg	4.3
2,4,6-Trinitrotoluene	26 ~~J, PG~~ NJ, ZC	260	ug/kg	20
2,4-Dinitrotoluene	31 U	260	ug/kg	5.4
2,6-Dinitrotoluene	31 U	260	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	31 U	260	ug/kg	13
2-Nitrotoluene	31 U	260	ug/kg	13
3-Nitrotoluene	31 U	260	ug/kg	16
4-Amino-2,6-dinitrotoluene	31 U	260	ug/kg	10
4-Nitrotoluene	31 U	260	ug/kg	19
HMX	31 U	260	ug/kg	12
Nitrobenzene	31 U	260	ug/kg	18
Nitroglycerin	61 U	510	ug/kg	15
PETN	61 U	510	ug/kg	26
RDX	31 U	260	ug/kg	12
Tetryl	31 U	260	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	102	(81 - 127)

NOTE(S):

J Estimated result. Result is less than RL.

PG The percent difference between the original and confirmation analyses is greater than 40%.

MM 05/11/11

015

CH2M Hill Inc

Client Sample ID: VEECA-4SMI10-0211

HPLC

Lot-Sample #...: G1B170553-007 Work Order #...: MEJ801A6 Matrix.....: SOLID
Date Sampled...: 02/15/11 08:45 Date Received..: 02/17/11
Prep Date.....: 02/28/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060228 Analysis Time..: 07:00
Dilution Factor: 1.02

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	31 U	260	ug/kg	9.0
1,3,5-Trinitrobenzene	31 U	260	ug/kg	10
1,3-Dinitrobenzene	31 U	260	ug/kg	4.3
2,4,6-Trinitrotoluene	31 U	260	ug/kg	20
2,4-Dinitrotoluene	31 U	260	ug/kg	5.4
2,6-Dinitrotoluene	31 U	260	ug/kg	7.4
2-Amino-4,6-dinitrotoluene	31 U	260	ug/kg	13
2-Nitrotoluene	31 U	260	ug/kg	13
3-Nitrotoluene	31 U	260	ug/kg	16
4-Amino-2,6-dinitrotoluene	31 U	260	ug/kg	10
4-Nitrotoluene	31 U	260	ug/kg	19
HMX	31 U	260	ug/kg	12
Nitrobenzene	31 U	260	ug/kg	18
Nitroglycerin	61 U	510	ug/kg	15
PETN	61 U	510	ug/kg	26
RDX	31 U	260	ug/kg	12
Tetryl	31 U	260	ug/kg	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(81 - 127)

VM 05/11/11

016

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021611-SMI

HPLC

Lot-Sample #...: G1B170553-010 Work Order #...: MEJ9G1A1 Matrix.....: WATER
Date Sampled...: 02/16/11 07:00 Date Received..: 02/17/11
Prep Date.....: 02/18/11 Analysis Date..: 02/26/11
Prep Batch #...: 1049097 Analysis Time..: 12:17
Dilution Factor: 1.02
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.051 U	0.51	ug/L	0.026
1,3,5-Trinitrobenzene	0.051 U	0.10	ug/L	0.032
1,3-Dinitrobenzene	0.051 U	0.15	ug/L	0.051
2,4,6-Trinitrotoluene	0.051 U	0.15	ug/L	0.051
2,4-Dinitrotoluene	0.051 U	0.15	ug/L	0.051
2,6-Dinitrotoluene	0.051 U	0.15	ug/L	0.051
2-Amino-4,6-dinitrotoluene	0.10 U	0.31	ug/L	0.10
2-Nitrotoluene	0.10 U	1.0	ug/L	0.090
3-Nitrotoluene	0.10 U	0.51	ug/L	0.058
4-Amino-2,6-dinitrotoluene	0.051 U	0.15	ug/L	0.051
4-Nitrotoluene	0.10 U	1.0	ug/L	0.090
HMX	0.051 U	0.15	ug/L	0.037
Nitrobenzene	0.051 U	0.15	ug/L	0.051
Nitroglycerin	0.51 U	1.0	ug/L	0.34
PETN	0.51 U	1.0	ug/L	0.31
RDX	0.051 U	0.26	ug/L	0.037
Tetryl	0.051 U	0.15	ug/L	0.051

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	97	(84 - 125)

U17

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09-0211

HPLC

Lot-Sample #...: G1B170553-001 Work Order #...: MEJ8E1A0 Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11
Prep Date.....: 03/09/11 Analysis Date..: 03/11/11
Prep Batch #...: 1068167 Analysis Time..: 00:00
Dilution Factor: 0.94
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.92 J	4.7	ug/kg	0.24

NOTE(S):

J Estimated result. Result is less than RL.

UM 042111

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09T-0211

HPLC

Lot-Sample #...:	G1B170553-002	Work Order #...:	MEJ8G1AA	Matrix.....:	SOLID
Date Sampled...:	02/15/11 09:55	Date Received..:	02/17/11		
Prep Date.....:	03/09/11	Analysis Date..:	03/11/11		
Prep Batch #...:	1068167	Analysis Time..:	00:17		
Dilution Factor:	1.01				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	1.1 J	5.0	ug/kg	0.26

NOTE(S):

J Estimated result. Result is less than RL.

WM 042111

015

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09TT-0211

HPLC

Lot-Sample #...:	G1B170553-003	Work Order #...:	MEJ8H1AH	Matrix.....:	SOLID
Date Sampled...:	02/15/11 09:55	Date Received..:	02/17/11		
Prep Date.....:	03/09/11	Analysis Date..:	03/11/11		
Prep Batch #...:	1068167	Analysis Time..:	00:35		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.84 J	5.0	ug/kg	0.26

NOTE(S):

J Estimated result. Result is less than RL.

MM 04/21/11

026

CH2M Hill Inc

Client Sample ID: VEECA-4SMI04-0211

HPLC

Lot-Sample #...: G1B170553-004 Work Order #...: MEJ8J1AA Matrix.....: SOLID
Date Sampled...: 02/15/11 11:40 Date Received..: 02/17/11
Prep Date.....: 03/09/11 Analysis Date..: 03/11/11
Prep Batch #...: 1068167 Analysis Time..: 00:52
Dilution Factor: 1.04
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	1.6 J	5.2	ug/kg	0.27

NOTE(S):

J Estimated result. Result is less than RL.

MM 042111

U21

CH2M Hill Inc

Client Sample ID: VEECA-4SMI06-0211

HPLC

Lot-Sample #...: G1B170553-005 Work Order #...: MEJ8V1AA Matrix.....: SOLID
Date Sampled...: 02/15/11 10:45 Date Received..: 02/17/11
Prep Date.....: 03/09/11 Analysis Date..: 03/11/11
Prep Batch #...: 1068167 Analysis Time..: 02:20
Dilution Factor: 0.93
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	1.3 J	4.6	ug/kg	0.24

NOTE(S):

J Estimated result. Result is less than RL.

WM 2/42/11

1122

CH2M Hill Inc

Client Sample ID: VEECA-4SMI07-0211

HPLC

Lot-Sample #...: G1B170553-006 Work Order #...: MEJ8X1AA Matrix.....: SOLID
Date Sampled...: 02/15/11 12:55 Date Received..: 02/17/11
Prep Date.....: 03/09/11 Analysis Date..: 03/11/11
Prep Batch #...: 1068167 Analysis Time..: 02:38
Dilution Factor: 1.01
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	1.2 J	5.0	ug/kg	0.26

NOTE(S):

J Estimated result. Result is less than RL.

MM 04211

U25

CH2M Hill Inc

Client Sample ID: VEECA-4SMI10-0211

HPLC

Lot-Sample #...: G1B170553-007 Work Order #...: MEJ801AA Matrix.....: SOLID
Date Sampled...: 02/15/11 08:45 Date Received..: 02/17/11
Prep Date.....: 03/09/11 Analysis Date..: 03/11/11
Prep Batch #...: 1068167 Analysis Time..: 02:55
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.81 J	5.0	ug/kg	0.26

NOTE(S):

J Estimated result. Result is less than RL.

MM 04/2/11

U24

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021611-SMI

Dissolved HPLC

Lot-Sample #...:	G1B170553-010	Work Order #...:	MEJ9G1A0	Matrix.....:	WATER
Date Sampled...:	02/16/11 07:00	Date Received..:	02/17/11		
Prep Date.....:	03/01/11	Analysis Date..:	03/02/11		
Prep Batch #...:	1060188	Analysis Time..:	05:22		
Dilution Factor:	1				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

U25

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI09-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8E
Matrix:	SOIL	Lab Sample ID:	G1B170553001
% Solids:	100.0	Date/Time Collected:	02/15/11 9:55
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	25200.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	9.9000			P
7440-39-3	Barium	27.1000			P
7440-41-7	Beryllium	0.3100	J		P
7440-43-9	Cadmium	0.4500	J		P
7440-70-2	Calcium	102000.00			P
7440-47-3	Chromium	41.9000			P
7440-48-4	Cobalt	7.5000			P
7440-50-8	Copper	23.1000			P
7439-89-6	Iron	26300.000			P
7439-92-1	Lead	2.0000	J		P
7439-95-4	Magnesium	7860.0000			P
7439-96-5	Manganese	543.0000		J MSH	P
7440-02-0	Nickel	13.1000			P
7440-09-7	Potassium	5400.0000			P
7782-49-2	Selenium	1.4000	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	306.0000	~~J~~	J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	48.6000			P
7440-66-6	Zinc	41.9000			P

U Result is less than the reporting limit (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/2/2011

026

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI09T-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8G
Matrix:	SOIL	Lab Sample ID:	G1B170553002
% Solids:	100.0	Date/Time Collected:	02/15/11 9:55
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	25900.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	11.4000			P
7440-39-3	Barium	27.4000			P
7440-41-7	Beryllium	0.3100	J		P
7440-43-9	Cadmium	0.4600	J		P
7440-70-2	Calcium	98400.000			P
7440-47-3	Chromium	41.7000			P
7440-48-4	Cobalt	7.5000			P
7440-50-8	Copper	22.9000			P
7439-89-6	Iron	26600.000			P
7439-92-1	Lead	1.9000	J		P
7439-95-4	Magnesium	7830.0000			P
7439-96-5	Manganese	533.0000		J MSH	P
7440-02-0	Nickel	13.0000			P
7440-09-7	Potassium	5470.0000			P
7782-49-2	Selenium	1.4000	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	299.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	49.2000			P
7440-66-6	Zinc	41.4000			P

U Result is less than the reporting limit (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

U27

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI09TT-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8H
Matrix:	SOIL	Lab Sample ID:	G1B170553003
% Solids:	100.0	Date/Time Collected:	02/15/11 9:55
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	22500.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	11.1000			P
7440-39-3	Barium	23.4000			P
7440-41-7	Beryllium	0.2800	J		P
7440-43-9	Cadmium	0.4000	J		P
7440-70-2	Calcium	85600.000			P
7440-47-3	Chromium	37.2000			P
7440-48-4	Cobalt	6.6000			P
7440-50-8	Copper	20.3000			P
7439-89-6	Iron	23000.000			P
7439-92-1	Lead	2.0000	J		P
7439-95-4	Magnesium	6850.0000			P
7439-96-5	Manganese	463.0000		J MSH	P
7440-02-0	Nickel	11.4000			P
7440-09-7	Potassium	4810.0000			P
7782-49-2	Selenium	1.7000	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	258.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	43.7000			P
7440-66-6	Zinc	42.4000			P

U Result is less than the reporting limit (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

U28

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI04-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8J
Matrix:	SOIL	Lab Sample ID:	G1B170553004
% Solids:	100.0	Date/Time Collected:	02/15/11 11:40
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	14500.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.4000			P
7440-39-3	Barium	22.3000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	149000.00			P
7440-47-3	Chromium	34.6000			P
7440-48-4	Cobalt	7.6000			P
7440-50-8	Copper	17.8000			P
7439-89-6	Iron	18800.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	6350.0000			P
7439-96-5	Manganese	670.0000		J MSH	P
7440-02-0	Nickel	9.8000			P
7440-09-7	Potassium	2490.0000			P
7782-49-2	Selenium	0.5400	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	2490.0000		J CCH	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	59.6000			P
7440-66-6	Zinc	28.5000			P

U Result is less than the reporting limit (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

AC 4/26/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI06-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8V
Matrix:	SOIL	Lab Sample ID:	G1B170553005
% Solids:	100.0	Date/Time Collected:	02/15/11 10:45
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	19200.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	13.4000			P
7440-39-3	Barium	33.6000			P
7440-41-7	Beryllium	0.2200	J		P
7440-43-9	Cadmium	0.1500	J		P
7440-70-2	Calcium	142000.00			P
7440-47-3	Chromium	36.3000			P
7440-48-4	Cobalt	7.2000			P
7440-50-8	Copper	21.4000			P
7439-89-6	Iron	22700.000			P
7439-92-1	Lead	1.3000	J		P
7439-95-4	Magnesium	5830.0000			P
7439-96-5	Manganese	683.0000		J MSH	P
7440-02-0	Nickel	12.0000			P
7440-09-7	Potassium	2890.0000			P
7782-49-2	Selenium	1.7000	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	225.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	69.5000			P
7440-66-6	Zinc	34.4000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JLC 4/26/11

036

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SM107-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ8X
Matrix:	SOIL	Lab Sample ID:	G1B170553006
% Solids:	100.0	Date/Time Collected:	02/15/11 12:55
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	20400.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	8.3000			P
7440-39-3	Barium	29.9000			P
7440-41-7	Beryllium	0.2400	J		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	120000.00			P
7440-47-3	Chromium	36.9000			P
7440-48-4	Cobalt	7.8000			P
7440-50-8	Copper	22.1000			P
7439-89-6	Iron	22800.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	7140.0000			P
7439-96-5	Manganese	584.0000		J MSH	P
7440-02-0	Nickel	12.2000			P
7440-09-7	Potassium	4180.0000			P
7782-49-2	Selenium	1.8000	~~+~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	415.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	48.1000			P
7440-66-6	Zinc	36.9000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/26/11

U3A

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI10-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEI80
Matrix:	SOIL	Lab Sample ID:	G1B170553007
% Solids:	100.0	Date/Time Collected:	02/15/11 8:45
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16000.000			P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	13.3000			P
7440-39-3	Barium	18.1000			P
7440-41-7	Beryllium	0.1800	J		P
7440-43-9	Cadmium	0.2000	J		P
7440-70-2	Calcium	154000.00			P
7440-47-3	Chromium	30.6000			P
7440-48-4	Cobalt	4.1000	J		P
7440-50-8	Copper	17.8000			P
7439-89-6	Iron	19000.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	6500.0000			P
7439-96-5	Manganese	321.0000		J MSH	P
7440-02-0	Nickel	8.8000			P
7440-09-7	Potassium	2660.0000			P
7782-49-2	Selenium	1.9000	~~J~~	J GBL	P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	297.0000	~~J~~	J CCH	P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	39.6000			P
7440-66-6	Zinc	28.4000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JLC 4/26/11

U32

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-EB01-021611-SMI
Lot Number:	G1B170553	Lab WorkOrder:	MEJ9G
Matrix:	WATER	Lab Sample ID:	G1B170553010
% Solids:	0.0	Date/Time Collected:	02/16/11 7:00
Units:	UG/L	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	65.5000	J		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)
J Estimated result. Result is less than RL.

JC 4/26/11

035

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09-0211

General Chemistry

Lot-Sample #...: G1B170553-001 Work Order #...: MEJ8E Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	03/02/11	1062230
	Dilution Factor: 1			Analysis Time..: 15:55	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140
	Dilution Factor: 1			Analysis Time..: 14:37	DL.....: 0.010	

JMC 4/26/11

034

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09T-0211

General Chemistry

Lot-Sample #...: G1B170553-002 Work Order #...: MEJ8G Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140

Dilution Factor: 1 Analysis Time..: 14:38 DL.....: 0.010

JC 4/26/11

035

CH2M Hill Inc

Client Sample ID: VEECA-4SMI09TT-0211

General Chemistry

Lot-Sample #...: G1B170553-003 Work Order #...: MEJ8H Matrix.....: SOLID
Date Sampled...: 02/15/11 09:55 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140

Dilution Factor: 1 Analysis Time..: 14:39 DL.....: 0.010

JLC 4/26/11

036

CH2M Hill Inc

Client Sample ID: VEECA-4SMI04-0211

General Chemistry

Lot-Sample #...: G1B170553-004 Work Order #...: MEJ8J Matrix.....: SOLID
Date Sampled...: 02/15/11 11:40 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	7.9	0.10	--	SW846 9045C	03/02/11	1062230
		Dilution Factor: 1		Analysis Time..: 15:59	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140
		Dilution Factor: 1		Analysis Time..: 14:39	DL.....: 0.010	

JLC 4/26/11

037

CH2M Hill Inc

Client Sample ID: VEECA-4SMI06-0211

General Chemistry

Lot-Sample #...: G1B170553-005 Work Order #...: MEJ8V Matrix.....: SOLID
Date Sampled...: 02/15/11 10:45 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.1	0.10	--	SW846 9045C	03/02/11	1062230
		Dilution Factor: 1		Analysis Time..: 16:07	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140
		Dilution Factor: 1		Analysis Time..: 14:41	DL.....: 0.010	

JAC 4/26/11

038

CH2M Hill Inc

Client Sample ID: VEECA-4SMI07-0211

General Chemistry

Lot-Sample #...: G1B170553-006 Work Order #...: MEJ8X Matrix.....: SOLID
Date Sampled...: 02/15/11 12:55 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.1	0.10	--	SW846 9045C	03/02/11	1062230
	Dilution Factor: 1			Analysis Time..: 16:11	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140
	Dilution Factor: 1			Analysis Time..: 14:42	DL.....: 0.010	

JAC 4/26/11

035

CH2M Hill Inc

Client Sample ID: VEECA-4SMI10-0211

General Chemistry

Lot-Sample #...: G1B170553-007 Work Order #...: MEJ80 Matrix.....: SOLID
Date Sampled...: 02/15/11 08:45 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	8.1	0.10	—	SW846 9045C	03/02/11	1062230
		Dilution Factor: 1		Analysis Time..: 16:15	DL.....: 0.10	
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/02/11	1063140
		Dilution Factor: 1		Analysis Time..: 14:43	DL.....: 0.010	

JAC 4/26/11

U46

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021611-SMI

General Chemistry

Lot-Sample #...: G1B170553-010 Work Order #...: MEJ9G Matrix.....: WATER
Date Sampled...: 02/16/11 07:00 Date Received..: 02/17/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 ~~U~~ UJ HT	10.0	ug/L	SW846 7196A	02/17/11	1054265

Dilution Factor: 1 Analysis Time..: 11:13 DL.....: 2.0

JBC 4/26/11

041

Case Narrative

TestAmerica West Sacramento Project Number G1B170553

General Comments

The sample VEECA-EB01-021611-SMI was received at the laboratory past the recommended 24 hour holding time for hexavalent chromium. The client was notified and authorized analysis of this sample.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Manual integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure, Acceptable Manual Integration Practices, SOP No.: S-Q-004, including Addendum 1.

Samples for analysis of all methods were processed by incremental sampling method techniques (ISM) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

The data for the laboratory duplicate and triplicate are reported as samples 8 and 9 for all analyses. The native sample is 7, client ID VEECA-4SMI10-0211. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of each summary section.

SOLID, 8330B, Nitroaromatics & Nitramines
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
The grinding blank associated with these samples has been reported as a method blank with work order ME11H1AD.

WATER, 8330B, Nitroaromatics & Nitramines
Sample: 10
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

Case Narrative

TestAmerica West Sacramento Project Number G1B170553

SOLID, 6850/DOD Handbook, Perchlorate
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MFD661AC
SMCS: MFD661AF

A Certified Reference Material (CRM) is analyzed with the associated samples and is reported on the LCS data evaluation and recovery reports, differentiated by its' workorder number:
CRM: MFD661AE

The grinding blank associated with these samples has been reported as a method blank with work order MFD661AD.

Samples: 2, 6
The noted samples required manual integration on perchlorate primary ion for baseline integration correction. Detailed manual integration information can be found in the Manual Integration Addendum section of this report.

WATER, 6850/DOD Handbook, Perchlorate
Sample: 10
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: ME1QH1AC
SMCS: ME1QH1AD

SOLID, 6010B/6020, Metals
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
The recoveries for aluminum, antimony, calcium, chromium, iron, and manganese are outside the established control limits for the MS/MSD associated with this batch. The concentrations of aluminum, calcium, iron, and manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

Due to historical results, all samples were run and reported at 5x dilutions for metals via method 6010B.

Case Narrative

TestAmerica West Sacramento Project Number G1B170553

SOLID, 6010B/6020, Metals (continued)
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
All samples required a 5-10x dilution for arsenic, selenium and thallium. Matrix interference (cations) caused suppression of the internal standard and failure of the closing calibration verification. The reporting limits have been raised accordingly.

An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -11. Calcium and sodium were detected at a reportable level. There were also detections between the LOQ and DL for selenium, copper, potassium and magnesium.

WATER, 6010B, Metals
Sample: 10
The method blank associated with this extraction batch has iron detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

SOLID, 7196A, Hexavalent Chromium
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9
An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -11.

WATER, 7196A, Hexavalent Chromium
Sample: 10
The noted sample was received in the laboratory after the holding time for the test had expired. The sample was analyzed after consultation with the client.
Sampling date: 2/16/11 @ 7:00
Received date: 2/17/11
Hold time expiration date: 2/17/11 @ 7:00
Analysis Date: 2/17/11 @ 11:13

There are no other anomalies associated with this project.

044

Sample Summary

TestAmerica West Sacramento Project Number G1B170553

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEJ8E	1	VEECA-4SMI09-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8G	2	VEECA-4SMI09T-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8H	3	VEECA-4SMI09TT-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8J	4	VEECA-4SMI04-0211	2/15/2011 11:40 AM	2/17/2011 08:50 AM
MEJ8V	5	VEECA-4SMI06-0211	2/15/2011 10:45 AM	2/17/2011 08:50 AM
MEJ8X	6	VEECA-4SMI07-0211	2/15/2011 12:55 PM	2/17/2011 08:50 AM
MEJ80	7	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9E	8	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9F	9	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9G	10	VEECA-EB01-021611-SMI	2/16/2011 07:00 AM	2/17/2011 08:50 AM
ME6E3	11	Grinding Blank	3/1/2011	3/1/2011 12:00 PM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

045

G1B170553

G1B170553

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1090
Phone #: (757) 671-6288
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State VA
Zip Code: 23462

Project #: 408840.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8736 9313 4182

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container Type / Preservatives

					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (If no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *wet for biosolids	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
*	VEECA-4SMI09-0211	02-15-11 0955	SMI	3	x		x														
	VEECA-4SMI09T-0211	02-15-11 0955	SMI	3	x																No pH on T sample
	VEECA-4SMI09TT-0211	02-15-11 0955	SMI	3	x																No pH on TT sample

* 1 of 3 jar w/ collection date of 2/14/11 ~~2/02/17/11~~

02/16/11

COMMENTS: 28-Day Turn Around Time, non-hazard.

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/14/11 1300	Fedex				17 Feb 2011 9:20
Relinquished By	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 373 - 5600

1 2 3

4 of 9 G1B1740

1

G1B170553

G1B170553

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 685-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FX.EC
Proj. Name/No.: ECA-RI
Airbill number: 8736 9313 4193

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whinaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container Type / Preservative

					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for duplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
	VEECA-4SMI04-0211	02-15-11 1140	SMI	3	x		x														
	VEECA-4SMI04-0211-MS	02-15-11 1140			x																no pH on MS
	VEECA-4SMI04-0211-SD	02-15-11 1140			x																no pH on SD
	VEECA-4SMI06-0211	02-15-11 1045	SMI	3	x		x														
	VEECA-4SMI07-0211	02-15-11 1255	SMI	3	x		x														
	VEECA-4SMI10-0211	02-15-11 0845	SMI	1	x		x														

02/16/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By.	Date/Time		Received By.
	02/16/11 1300	FEDEX				17 Feb 2011 9:20
Relinquished By.	Date/Time	Received By:	Relinquished By.	Date/Time		Received By

TestAmerica West Sacramento (916) 373 - 5600

10 of 1740

(2)

G1B170553

G1B170553

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel. (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8738 9313 4208

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container Type Preservative

Sample Description	Date/Time Collected	Matrix (aq, so, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for sediment	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
				Soil MIS			8330 Metals + pH "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
				4°C, headspace			4°C, headspace				None	4°C	field filter d 2µm, headspace, 4°C on light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter d 45µm, 4°C	Preservative
2/24/11																				
*	VEECA-4SMI10-0211	02-15-11 0845	SMI	2	x		x													
	VEECA-EB01-021611-SMI	02-16-11 0700	aq	5								2	1	1	1					
*	containers w/collection ~~Time of~~ date of 02/14/11 - on 02/17/11																			

02/16/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/16/11 1300	FedEx				17 Feb 2011 9:20
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

TestAmerica West Sacramento (916) 374 - 5600

11 of 1740

U46

3

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M Hill PM KS LOG # 69390

LOT# (QUANTIMS ID) G1B170553 QUOTE# 88113 LOCATION W6D

Checked (✓)

DATE RECEIVED 02/17/11 TIME RECEIVED 0850 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) See Multi Cooler Checklist ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☐ #5 ☐ ☐ OTHER _____ ☑

Initials: W Date: 02/17/11

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☐ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☐ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☐ PM NOTIFIED

Initials: EV Date: 02/17/11

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

045

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B170553

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB										2										
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ	3	3	3	3	3	3	3	3	3											
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn										1										
500PJna																				
500PJzn/na																				
250PJ										2										
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____*CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

050

G1B170553

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B170553

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2	pH≤2
			X											✓										
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

QA-611 Pres Check.xls Sheet1

QA-611
Revised 3/24/2010 ERS

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B170553

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [ ] ___ [✓]

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ [✓]

Are the chromatograms free of interferences? [ ] ___ [✓]

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/15/11 Prep 2/28 + 2/18 (W)
Rec'd 2/17 Analy (W) 2/26 + 3/05

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

temp 1-3°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

Listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

Listed on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just std dev and value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] [ ] [ ]

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [ ] [✓] [ ]

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] [ ] [ ]

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ [✓]

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ [✓]

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Ø Soil
___out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

Ø Soil
__out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? [✓] ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? [✓] ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? [✓] ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ [✓] ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ [✓] ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro-RP C18 (250nm-265nm)

column 2: Synergi Hydro-RP C18 (358-205)

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] [✓] ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

W/in 1 min

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? see below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Not provided w/ daily RTW Data Validator checked CCal in sequence and compared RT and checked stability -OK

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) [✓] ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines)

Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? [✓] ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [✓] 04/19/11

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? Checked by data Validator [ ] ✓ ___

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

065

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [✓] ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [✓] ___ ___

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [✓] ___

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] [✓] ___

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

Lab Name: TestAmerica West Sacramento

Lab Sample ID: G1B170553 6
Instrument ID (1): LC10 Instrument ID (2): Cyano
LC Column (1): C18 LC Column (2): Cyano
Analysis Date (1): 3/5/2011 Analysis Date (2): 3/5/2011

CMPNAM	Result(Col1)	Result(Col2)	%D	Q
1,3,5-Trinitrobenzene	ND	NA	NA	
1,3-Dinitrobenzene	ND	NA	NA	
2,4,6-Trinitrotoluene	26.38	89.87	109%	PG
2,4-Dinitrotoluene	ND	NA	NA	
2,6-Dinitrotoluene	ND	NA	NA	
2-Amino-4,6-dinitrotoluene	ND	NA	NA	
3,5-Dinitroaniline	ND	NA	NA	
4-Amino-2,6-dinitrotoluene	ND	NA	NA	
RDX	ND	NA	NA	
TETRYL	ND	NA	NA	
m-Nitrotoluene	ND	NA	NA	
Nitrobenzene	ND	NA	NA	
Nitroglycerin	ND	NA	NA	
HMX	ND	NA	NA	
o-Nitrotoluene	ND	NA	NA	
PETN	ND	NA	NA	
p-Nitrotoluene	ND	NA	NA	

NJ

LC10
Sample
15.37

CCV 15.37
15.37

LC12
Sample 41.73
41.71
41.71

raising baseline in conf col.

Sample Summary

TestAmerica West Sacramento Project Number G1B170553

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEJ8E	1	VEECA-4SMI09-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8G	2	VEECA-4SMI09T-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8H	3	VEECA-4SMI09TT-0211	2/15/2011 09:55 AM	2/17/2011 08:50 AM
MEJ8J	4	VEECA-4SMI04-0211	2/15/2011 11:40 AM	2/17/2011 08:50 AM
MEJ8V	5	VEECA-4SMI06-0211	2/15/2011 10:45 AM	2/17/2011 08:50 AM
MEJ8X	6	VEECA-4SMI07-0211	2/15/2011 12:55 PM	2/17/2011 08:50 AM
MEJ80	7	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9E	8	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9F	9	VEECA-4SMI10-0211	2/15/2011 08:45 AM	2/17/2011 08:50 AM
MEJ9G	10	VEECA-EB01-021611-SMI	2/16/2011 07:00 AM	2/17/2011 08:50 AM
ME6E3	11	Grinding Blank	3/1/2011	3/1/2011 12:00 PM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate → VEECA-4SMI09-0211 no ⊕

Initial Calibration Date: 1/9/2011

RRF and %RSD Calculations:

Compound Name: 3-nitrotoluene, level 4
Lab Value: 48.9000

Height of Compound	2445
Conc. of Compound	50
Calculated RF	48.900

Compound Name: nitrobenzene
Lab Value: 9.1

RF of STD 1	79.20
RF of STD 2	78.60
RF of STD 3	73.50
RF of STD 4	73.10
RF of STD 5	70.20
RF of STD 6	72.35
RF of STD 7	66.88
RF of STD 8	59.02
Calculated % RSD	9.1

Continuing Calibration File ID: 2/26/11, 8:31

RRF and %D Calculations:

Compound Name: tertyl
Lab Value:

Height of Compound	10227
Conc. of Compound	100
Calculated RF	102.270

Compound Name: tertyl
Lab Value: 10

Average RF	92.905
RF of CCV	102.270
Calculated % D	-10

SAMPLE CALCULATION

Sample ID: VEECA-4SMI7-0211
Standard ID: ICAL 01/09/11
Compound: 2,4,6-trinitrotoluene
Concentration: 26 ug/Kg

	Water (ug/L)	Soil (ug/Kg)
Height of Compound		302
RF of Compound		94.21575
Final Volume		80
Dilution Factor		1
Split Factor		1
Injection Volume		1
Weight of Sample	na	9.72
Initial Volume of Sample		NA
Conversion Factor		1
Percent Solids Factor		1
Concentration	#DIV/0!	26.38

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 5:47 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI
Attachments: 8330 Form X.PDF; 8330 Form X.XLS; Cross Reference Summaries.pdf

Hi Laura,
Attached are The other forms you requested. We're providing both an excel summary and pdfs of the summary. I wasn't sure which would be easier for you to use. I've also provided a cross-reference summary as we're only showing the lab IDs on the forms. Please let me know if you need anything else.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:48	5:06				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (sum)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MS 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory Retention Time Window Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/18/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/15/11
Received Date: 2/17/11
Extraction Date: 3/1-9/11
Analysis Dates: 3/2-11/11
Cooler Temp: 1-3°C

All extraction and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

All method and/or grinding blanks exhibited no contamination-no qualifications required. Associated QC blanks were: VEECA-EB01-021611-SMI (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for sample VEECA-4SMI04-0211—all criteria were met.

Field Triplicate Sample

A field triplicate was submitted for sample VEECA-4SMI09-0211- no qualifications required, see attached sheet.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data and calculations were verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer L Mascellino **Date:** 4/20/11

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI09-0211
Duplicate Sample ID: VEECA-4SMI09T-0211
Triplicate Sample ID: VEECA-4SMI09TT-0211

Water: RPD>30%
Soil: RPD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
perchlorate	0.92	1.1	0.84	0.133166562	0.953333333	14%

COMMENTS. No qualifications required

GIB170553

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]		
Legible?	[✓]		
Signature of sample custodian present?	[✓]		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	✓	___
RAS/Non-RAS Case No.?	[___]	✓	___
SDG No.?	[✓]	___	___

		YES	NO	N/A
	Contract No.?	[ ]	✓	
	ACTION: If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.			
A.1.7.2	After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:			
	(a) all analytes analyzed by ICP-AES?		✓	
	(b) all analytes analyzed by ICP-MS?		✓	
	(c) Mercury?			✓
	(d) Cyanide?			✓
	ACTION: If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.			

A.1.8 **Raw Data**

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 **Digestion/Distillation Log**

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓
Are pH values for metals and			

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B170553

3/3, 1830

ICP - AES	
SAMPLE ID	VEECA-4SM09T-0211
ANALYTE	barium
Lab Value CONCENTRATION (mg/Kg)	27.4
AMOUNT FROM RAW DATA (ug/ml)	0.10854
SAMPLE SIZE (g)	0.989
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	27.437

3/7, 1027

ICP-MS	
SAMPLE ID	VEECA-4SMI07-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	8.3
AMOUNT FROM RAW DATA (ug/L)	16.443895
SAMPLE SIZE (g)	0.987
FINAL VOLUME (L)	0.05
DILUTION FACTOR	10
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	8.33024

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments?			✓
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?			✓
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

		YES	NO	N/A
A.1.9.1	Cyanide distillation(14 days)exceeded?		[ ]	✓
	Mercury analysis(28 days) exceeded?		[ ]	✓
	Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

		YES	NO	N/A
A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?	[✓]		
	Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

		YES	NO	N/A
A.1.9.3	Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[✓]	___	___

Dilutions were required but these were not noted on Form I's

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[___]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[___]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]	___	___
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	___

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]	___	___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

	YES	NO	N/A
Mercury Analysis?	[___]	___	✓
Cyanide Analysis? JAC 4/26/11	[✓]	___	___
ICP-AES(more than 2 point Calib.)?	[___]	___	✓
ICP-MS (more than 2 point calib.)?	[___]	___	✓

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

	YES	NO	N/A
A.1.12.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.12.2 Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

	YES	NO	N/A
A.1.12.3 Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	___ ✓	___
Hg - 80-120%R?	[___]	___	___ ✓
Cyanide - 85-115%R?	[___]	___	___ ✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

See following pages for quals

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B170553 Instrument Id: M02

Units: ug/L Datafile Name: 110307B2

Analyte	True Conc.	03/07/11 17:38 CCV 7 Found %REC	03/07/11 18:05 CCV 8 Found %REC	03/07/11 18:11 CCV 9 Found %REC
Arsenic	100	100.77 100.8	100.33 100.3	101.00 101.0
Selenium	100	111.94 111.9	112.08 112.1	104.10 104.1
Thallium	50	48.28 96.6	48.07 96.1	51.41 102.8

NQ - no samples associated

Lot Number: G1B170553 Instrument Id: M02

Units: ug/L Datafile Name: 110307B2

Analyte	True Conc.	03/07/11 18:38 CCV 10 Found %REC
Arsenic	100	95.61 95.6
Selenium	100	93.86 93.9
Thallium	50	51.19 102.4

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/01/11 16:07 ICV4 Found %REC	03/01/11 16:09 ICV2A Found %REC
Magnesium	0		4.78 0.0
	10000	9783.8 97.8	
Manganese	0		
	1000	1026.6 102.7	
Nickel	0		
	1000	1025.1 102.5	
Potassium	0		98.00 0.0
	10000	9984.5 99.8	
Silver	0		
	250	241.62 96.6	
Sodium	10000	11713 117.1	
	25000		25513 102.1
Vanadium	0		
	1000	973.61 97.4	
Zinc	0		1.47 0.0
	1000	993.06 99.3	

NQ - no + result in assoc. sample

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/03/11 16:47 ICV4		03/03/11 16:49 ICV2A	
		Found	%REC	Found	%REC
Lead	250	257.84	103.1		
Magnesium	0			3.46	0.0
	10000	9860.2	98.6		
Manganese	0				
	1000	1033.4	103.3		
Nickel	0				
	1000	1032.0	103.2		
Potassium	0			116.66	0.0
	10000	9963.1	99.6		
Silver	0				
	250	244.68	97.9		
Sodium	10000	11679	116.8		
	25000			25811	103.2
Vanadium	0				
	1000	986.19	98.6		
Zinc	0			2.44	0.0
	1000	1002.2	100.2		

J+ in all soil samples

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/08/11 15:36 ICV4 Found	%REC	03/08/11 15:39 ICV2A Found	%REC
Lead	0			1.18	0.0
	250	264.71	105.9		
Magnesium	0			5.60	0.0
	10000	9882.1	98.8		
Manganese	0				
	1000	1033.3	103.3		
Nickel	0			1.02	0.0
	1000	1026.5	102.7		
Potassium	0			37.10	0.0
	10000	9841.4	98.4		
Silver	0				
	250	245.68	98.3		
Sodium	10000	11775	117.8		
	25000			26036	104.1
Vanadium	0				
	1000	991.06	99.1		
Zinc	0			2.06	0.0
	1000	1002.1	100.2		

No Quals - grinding blk only

CH2M Hill Inc

Initial and Continuing Calibration Verification

Lot Number: G1B170553 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110224A1

Analyte	True Conc.	02/25/11 01:15 CCV 16 Found %REC	02/25/11 01:22 CCV 17 Found %REC	02/25/11 02:02 CCV 18 Found %REC
Arsenic	100	110.59 110.6	98.82 98.8	99.84 99.8
Selenium	100	122.89 122.9	100.00 100.0	100.24 100.2
Thallium	50	50.68 101.4	50.08 100.2	49.03 98.1

NA no samples assoc.

Lot Number: G1B170553 **Instrument Id:** M01

Units: ug/L **Datafile Name:** 110224A1

Analyte	True Conc.	02/25/11 02:09 CCV 19 Found %REC	02/25/11 02:39 CCV 20 Found %REC	02/25/11 02:46 CCV 21 Found %REC
Arsenic	100	98.73 98.7	99.79 99.8	99.86 99.9
Selenium	100	100.80 100.8	99.42 99.4	100.47 100.5
Thallium	50	49.68 99.4	49.80 99.6	50.06 100.1

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]		
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]		
For each mercury run, was a CRQL standard analyzed?	[ ]		✓
For each cyanide run, was a CRQL standard analyzed?	[ ]		✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓]

frequency per lab method/SOP

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:22 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B170553_LLQS.pdf; G1B170426_LLQS.pdf; G1B120440_LLQS.pdf; G1B120421_LLQS.pdf; G1B110556_LLQS.pdf

Hi Jackie,
Attached are the next 5 files of data for this project.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE. This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? in assoc samples	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than <50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL			
A.1.14.2.1	When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.	no quals necessary		
A.1.14.2.2	When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative CRQL?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.			

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B170553 Instrument Id: M02

Units: ug/L Datafile Name: 110307B2

Analyte	03/07/11 16:01 CCB 1	03/07/11 16:10 CCB 2	03/07/11 16:43 CCB 3
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	3.0 U	3.0 U	3.0 U
Thallium	1.5 U	1.5 U	1.5 U

Lot Number: G1B170553 Instrument Id: M02

Units: ug/L Datafile Name: 110307B2

Analyte	03/07/11 16:51 CCB 4	03/07/11 17:28 CCB 5	03/07/11 17:35 CCB 6
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	3.0 U	3.0 U	3.0 U
Thallium	1.5 U	1.5 U	1.5 U

Lot Number: G1B170553 Instrument Id: M02

Units: ug/L Datafile Name: 110307B2

Analyte	03/07/11 17:41 CCB 7	03/07/11 18:08 CCB 8	03/07/11 18:14 CCB 9
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	3.0 U	5	3.0 U
Thallium	1.5 U	1.5 U	1.5 U

no samples associated

	YES	NO	N/A

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	BLK - G1C010000241B
Lot Number:	G1B170553	Lab WorkOrder:	ME111
Matrix:	WATER	Lab Sample ID:	G1C010000241B
Instrument Id:	T01	Analysis Date/Time:	3/1/2011 5:19:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	20.9000	J	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	250.0000	U	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

No Quals required

Result is less than the reporting limit. (RL)

Estimated Result. Result is less than RL.

		YES	NO	N/A
	but ≤ CRQL to CRQL with a "U".	no quals necessary		
A.1.15.2.2	When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
	If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
	If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓ ___

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

see following page for any action due to gunding blank

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3	Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4	When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	Grinding Blank
Lot Number:	G1B170553	Lab WorkOrder:	ME6E3
Matrix:	WATER	Lab Sample ID:	G1B170553011
% Solids:	0.0	Date/Time Collected:	03/01/11 0:00
Units:	UG/L	Date/Time Received:	03/01/11 12:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	10.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	1380.0000			P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	4.7000	J		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	389.0000	J		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	350.0000	J		P
7782-49-2	Selenium	13.1000	J		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	1220.0000			P
7440-28-0	Thallium	5.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

No Quals

No Quals

No Quals

No Quals
J all + in field samples
J all + in field samples

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]		
	Was ICS analyzed at the beginning and end of each ~~analytical~~ run, and once for ~~every~~ 20 analytical samples? @ beginning only	[✓]		
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]		
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]		
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[ ]		✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

	YES	NO	N/A
A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[___]	✓	___

one std was out but lab immediately reran std - criteria was met

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

CH2M Hill Inc

Interference Check Standard AB

Instrument Id: M02

Lot Number: G1B170553

Datafile Name: 110306A2

Units: ug/L

Analyte	Spike Amount	ICSAB 03/06/11 09:45		ICSAB 03/06/11 09:58	
		Found	%REC	Found	%REC
Arsenic	100	32.32	32.3	104.74	104.7
Selenium	100	33.44	33.4	111.73	111.7
Thallium	50	14.82	29.6	46.87	93.7

L No Quals - std was rerun & met criteria.

Instrument Id: M02

Lot Number: G1B170553

Datafile Name: 110307A2

Units: ug/L

Analyte	Spike Amount	ICSAB 03/07/11 08:45		ICSAB 03/07/11 15:37	
		Found	%REC	Found	%REC
Arsenic	100	108.22	108.2	105.12	105.1
Selenium	100	111.58	111.6	109.52	109.5
Thallium	50	50.15	100.3	48.11	96.2

CH2M Hill Inc

Interference Check Standard A

Instrument Id: M02

Lot Number: G1B170553

Datafile Name: 110306A2

Units: ug/L

Analyte	Spike Amount	ICSA 03/06/11 09:42 Found	ICSA 03/06/11 09:55 Found
Arsenic	0	63.72	2.00
Selenium	0	65.40	-0.78
Thallium	0	30.06	0.34

No Quals - std was rerun & met criteria

Instrument Id: M02

Lot Number: G1B170553

Datafile Name: 110307A2

Units: ug/L

Analyte	Spike Amount	ICSA 03/07/11 08:42 Found	ICSA 03/07/11 15:33 Found
Arsenic	0	1.26	0.78
Selenium	0	1.27	0.09
Thallium	0	0.25	0.17

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[ ]	✓	

1 std did not meet criteria but lab rerun it & criteria was met.

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

A.1.17.1 Was Matrix Spike analysis performed:

	YES	NO	N/A
For each matrix type?	[✓]		
For each SDG?	[✓]		
On one of the SDG samples?	[✓]		
For each concentration range (i.e., low, med., high)?	[✓]		
For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]		
Was a spiked sample prepared and analyzed with the SDG samples?	[✓]		

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	✓	[___]	___

ACTION:
If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.

for water QC - from a different SDG
no action required

A.1.17.3 Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.

Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	✗

NOTE:
Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.

X2 corr JAC 4/26/11

Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	✗

ACTION:
If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.

A.1.17.4 **Aqueous**

Are any spike recoveries:

(a) less than 30%?	___	[___]	✓
(b) between 30-74%?	___	[___]	___
(c) between 126-150%?	___	[___]	___
(d) greater than 150%?	___	[___]	✓

ACTION:
If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SMI04-0211
Lot Number:	G1B170553	**MS Lab Workorder:**	MEJ8J - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B170553004S
% Solids	100.0	**QC Batch ID:**	1062212
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	18200.0000	N	14500.0000		101.0000	3680.0	N	P	*
Antimony	80 - 120	7.5500	N	10.0000		25.3000	27.0	N	P	J/UJ
Barium	80 - 120	117.0000		22.3000		101.0000	94.0		P	
Beryllium	80 - 120	2.3800		0.5000		2.5300	90.0		P	
Cadmium	80 - 120	2.4300		0.1800	J	2.5300	89.0		P	
Calcium	80 - 120	158000.0000	N	149000.0000		2530.0000	338.0	N	P	*
Chromium	80 - 120	47.8000	N	34.6000		10.1000	131.0	N	P	J+
Cobalt	80 - 120	30.6000		7.6000		25.3000	91.0		P	
Copper	80 - 120	29.8000		17.8000		12.7000	95.0		P	
Iron	80 - 120	20100.0000	N	18800.0000		50.6000	2550.0	N	P	*
Lead	80 - 120	22.0000		2.5000		25.3000	86.0		P	
Magnesium	80 - 120	8890.0000		6350.0000		2530.0000	100.0		P	
Manganese	80 - 120	710.0000	N	670.0000		25.3000	161.0	N	P	*
Nickel	80 - 120	32.7000		9.8000		25.3000	91.0		P	
Potassium	80 - 120	5060.0000		2490.0000		2530.0000	101.0		P	
Silver	75 - 120	2.4300		1.0000		2.5300	94.0		P	
Sodium	80 - 120	4960.0000		2490.0000		2530.0000	97.0		P	
Vanadium	80 - 120	88.9000		59.6000		25.3000	116.0		P	
Zinc	80 - 120	51.3000		28.5000		25.3000	90.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

116

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	Client Sample ID:	VEECA-4SMI04-0211
Lot Number:	G1B170553	MS Lab Workorder:	MEJ8J - MSD
Matrix:	SOIL	MS Lab Sample ID:	G1B170553004D
% Solids	100.0	QC Batch ID:	1062212
Units:	MG/KG	Instrument ID:	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	18500.0000	N	14500.0000		99.9000	3990.0	N	P	*
Antimony	80 - 120	8.0800	N	10.0000		25.0000	29.0	N	P	J+
Barium	80 - 120	116.0000		22.3000		99.9000	94.0		P	
Beryllium	80 - 120	2.3500		0.5000		2.5000	90.0		P	
Cadmium	80 - 120	2.3700		0.1800	J	2.5000	88.0		P	
Calcium	80 - 120	157000.0000	N	149000.0000		2500.0000	295.0	N	P	*
Chromium	80 - 120	48.4000	N	34.6000		9.9900	138.0	N	P	J+
Cobalt	80 - 120	30.2000		7.6000		25.0000	90.0		P	
Copper	80 - 120	30.2000		17.8000		12.5000	99.0		P	
Iron	80 - 120	20400.0000	N	18800.0000		50.0000	3210.0	N	P	*
Lead	80 - 120	21.5000		2.5000		25.0000	85.0		P	
Magnesium	80 - 120	8920.0000		6350.0000		2500.0000	103.0		P	
Manganese	80 - 120	713.0000	N	670.0000		25.0000	173.0	N	P	*
Nickel	80 - 120	32.6000		9.8000		25.0000	91.0		P	
Potassium	80 - 120	5070.0000		2490.0000		2500.0000	103.0		P	
Silver	75 - 120	2.2900		1.0000		2.5000	90.0		P	
Sodium	80 - 120	4960.0000		2490.0000		2500.0000	99.0		P	
Vanadium	80 - 120	89.6000		59.6000		25.0000	120.0		P	
Zinc	80 - 120	51.4000		28.5000		25.0000	92.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance

115

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	✓	[___]	___
ACTION: If yes for any of the above, proceed as follows:			
See following pages for flags			
If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" if greater than 200%, reject (R) and red-line all associated data ≥ MDL. (**NOTE**:Replace "N" with "J" or "R" as appropriate.)			
A.1.18 **Lab Duplicates) - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD RPDs

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[___]	✓	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.
NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	___	[___]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5	Circle on each Appendix A.4 all values that have: RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI09-0211
Duplicate Sample ID: VEECA-4SMI09T-0211
Triplicate Sample ID: VEECA-4SMI09TT-0211

Water: RSD>30%
Soil: RSD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	25200	25900	22500	1795.36	24533.33	7%
barium	27.1	27.4	23.4	2.23	25.97	9%
beryllium	0.31	0.31	0.28	0.02	0.30	6%
cadmium	0.45	0.46	0.4	0.03	0.44	7%
calcium	102000	98400	85600	8619.36	95333.33	9%
chromium	41.9	41.7	37.2	2.66	40.27	7%
cobalt	7.5	7.5	6.6	0.52	7.20	7%
copper	23.1	22.9	20.3	1.56	22.10	7%
iron	26300	26600	23000	1997.50	25300.00	8%
lead	2	1.9	2	0.06	1.97	3%
magnesium	7860	7830	6850	574.66	7513.33	8%
manganese	543	533	463	43.59	513.00	8%
nickel	13.1	13	11.4	0.95	12.50	8%
potassium	5400	5470	4810	362.54	5226.67	7%
sodium	306	299	258	25.93	287.67	9%
vanadium	48.6	49.2	43.7	3.02	47.17	6%
zinc	41.9	41.4	42.4	0.50	41.90	1%
arsenic	9.9	11.4	11.1	0.79	10.80	7%
thallium				#DIV/0!	#DIV/0!	#DIV/0!
selenium	1.4	1.4	1.7	0.17	1.50	12%

COMMENTS: No qualifications required

Lab Dup

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI10-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ9E
Matrix:	SOIL	Lab Sample ID:	G1B170553008
% Solids:	100.0	Date/Time Collected:	02/15/11 8:45
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	16400.000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	14.9000			P
7440-39-3	Barium	18.2000			P
7440-41-7	Beryllium	0.1900	J		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	154000.00			P
7440-47-3	Chromium	31.6000			P
7440-48-4	Cobalt	3.9000	J		P
7440-50-8	Copper	18.1000			P
7439-89-6	Iron	19300.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	6630.0000			P
7439-96-5	Manganese	321.0000			P
7440-02-0	Nickel	9.0000			P
7440-09-7	Potassium	2730.0000			P
7782-49-2	Selenium	1.8000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	300.0000	J		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	40.7000			P
7440-66-6	Zinc	29.2000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/26/11

Lab Dup

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-4SMI10-0211
Lot Number:	G1B170553	Lab WorkOrder:	MEJ9F
Matrix:	SOIL	Lab Sample ID:	G1B170553009
% Solids:	100.0	Date/Time Collected:	02/15/11 8:45
Units:	MG/KG	Date/Time Received:	02/17/11 8:50

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	17600.000			P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	13.6000			P
7440-39-3	Barium	19.7000			P
7440-41-7	Beryllium	0.2000	J		P
7440-43-9	Cadmium	0.2000	J		P
7440-70-2	Calcium	167000.00			P
7440-47-3	Chromium	33.2000			P
7440-48-4	Cobalt	4.3000	J		P
7440-50-8	Copper	19.1000			P
7439-89-6	Iron	20700.000			P
7439-92-1	Lead	2.5000	U		P
7439-95-4	Magnesium	7020.0000			P
7439-96-5	Manganese	345.0000			P
7440-02-0	Nickel	9.7000			P
7440-09-7	Potassium	2940.0000			P
7782-49-2	Selenium	1.3000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	321.0000	J		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	42.8000			P
7440-66-6	Zinc	31.3000			P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/26/11

LAB DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-4SMI10-0211 (8)
Duplicate Sample ID: VEECA-4SMI10-0211 (9)

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	16400	17600	7
arsenic	14.9	13.6	9
barium	18.2	19.7	8
beryllium	0.19	0.2	5
cadmium	0.18	0.2	11
calcium	154000	167000	8
chromium	31.6	33.2	5
cobalt	3.9	4.3	10
copper	18.1	19.1	5
iron	19300	20700	7
lead			#DIV/0!
magnesium	6630	7020	6
manganese	321	345	7
nickel	9	9.7	7
potassium	2730	2940	7
selenium	1.8	1.3	32
sodium	300	321	7
vanadium	40.7	42.8	5
zinc	29.2	31.3	7

COMMENTS: Lab designated lab dup - not used to qualify samples - no impact on reported results.

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓
	ACTION: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.	Field Triplicate Assessed see next page		
A.1.20	**Laboratory Control Sample (LCS) - Form VII**			
A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___
	ACTION: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.			
	NOTE: If only one LCS was analyzed for			

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[✓]	___
Between 121% and 150%?	___	[✓]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[___] ✓	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[___] ✓	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[___]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[___] ✓	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

ICP SERIAL DILUTIONS

Lab Name:	TestAmerica West Sacramento	MS Lab Workorder:	MEJ8JP25
Lot Number:	G1B170553	MS Lab Sample ID:	G1B170553004
Matrix:	SOIL	QC Batch ID:	1061267
Instrument Id:	M02	Analysis Date/Time:	3/6/2011 12:28:02PM
Concentration Units:	UG/L	Method:	6020

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M
Arsenic	107.6820		124.1252	J	15.27	E	P
Selenium	10.7610	J	38.7922	J	260.49		P
Thallium	0.7678	U	-2.9866	U			P

NQ

no qualo required · results in sample are < 50X LOQ (criteria per DOD)

		YES	NO	N/A
	when initial concentrations ≥ 50 x ~~MDLs~~ LOQS.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	✓	[___]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

Dilutions were necessary & were performed

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	___
Was the %RI for the ~~two fold~~ 5-fold or 10-fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[✓]	___	___

Dilutions were required due to matrix interferences

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

CH2M Hill Inc

Client Sample ID: Grinding Blank

General Chemistry

Lot-Sample #...: G1B170553-011 Work Order #...: ME6E3 Matrix.....: WATER
Date Sampled...: 03/01/11 Date Received..: 03/01/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	03/02/11	1063138

Dilution Factor: 1 Analysis Time..: 14:33 DL.....: 2.0

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/15-2/16
Received Date: 2/17 Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/2 – soils
Analysis Dates: 3/2 – soils; 2/17 - water

The rinse blank exceeded the 24 hour holding time requirement by approximately 4 hours. All reported results were qualified as estimated J/UJ.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
G1B230000-265 MBLK	hexavalent chromium	2.7J ug/L	LOD

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code
VEECA-4SMI10-0211	hexavalent chromium	U at LOD	MBL

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair submitted in this SDG exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: None Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No positive results were reported.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results above the LOD were reported in the samples in this SDG. A triplicate set was analyzed and no positive results were reported. Clarification of the calculations was requested from the laboratory. No additional qualifications to the data were required.

Reviewer JACleveland **Date:** 4/27/11

METHOD BLANK REPORT

General Chemistry

Client Lot #...: G1B170553 Matrix.....: WATER

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium		Work Order #: MEQ0L1AA		MB Lot-Sample #:	G1B230000-265	
	5.0 U	10.0	ug/L	SW846 7196A	02/17/11	1054265
		Dilution Factor: 1				
		Analysis Time..: 11:12				
Hexavalent Chromium		Work Order #: ME68H1AA		MB Lot-Sample #:	G1C040000-138	
	2.7 J	10.0	ug/L	SW846 7196A	03/02/11	1063138
		Dilution Factor: 1				
		Analysis Time..: 14:31				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than RL.

U @ LOD in 45M110

Hexavalent Chromium Calcs - ICAL soils - 3/2/11

X - Response	Y - Concentration (mg/L)
0	0
0.005	0.005
0.008	0.01
0.019	0.025
0.041	0.05
0.083	0.1

slope, m (A1) =	1.206688155
y-int. (A0) =	0.000292775
r =	0.999635559
Rr2=	0.999271251

VEECA-4SMI04-0211 MS Lab Value - 0.235 mg/Kg
Response = 0.039

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0.047353613 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	8.05
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	1
Concentration =	0.235297456 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B180604, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B180604. The data validation was performed in accordance with the SW-846 methods utilized by the laboratory; the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011; and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) and perchlorate (SW846 method 6850). 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	Metals 6010B	Metals 6020	Cr(VI)
VEECA-6SMI02TT-0211	G1B180604-001	soil	X	X	X
VEECA-6SMI01-0211	G1B180604-002	soil	X	X	X
VEECA-6SMI03-0211	G1B180604-003	soil	X	X	X
VEECA-EB01-021711-SMI	G1B180604-004	water	X	X	X
VEECA-6SMI02-0211	G1B180604-005	soil	X	X	X
VEECA-6SMI02T-0211	G1B180604-006	soil	X	X	X
VEECA-EB02-021711-SMI	G1B180604-007	water	X	X	X
VEECA-6SMI07-0211	G1B180604-008	soil	X	X	X
VEECA-6SMI09-0211	G1B180604-009	soil	X	X	X
VEECA-6SMI04-0211 MS	G1B180604-001MS	soil	X	X	X
VEECA-6SMI04-0211 MSD	G1B180604-001MSD	soil	X	X	X

The following quality control samples were provided with this SDG: sample VEECA-EB01-021711-SMI and VEECA-EB02—021711-SMI-equipment blanks; and samples VEECA-6SM102T-0211 and VEECA-6SM10TT-0211-sample duplicate and triplicate of field sample VEECA-6SM102-0211.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

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

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

Overall Evaluation of Data/Potential Usability Issues

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

Metals

Qualification was required for one analyte due to contamination in the associated grinding blank. The Region II guidelines for qualifying samples based on method blanks were applied to the grinding blanks.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

Hexavalent Chromium

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/16-17/11 and samples were received at the laboratory on 2/18/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

Metals

The associated grinding blank exhibited contamination as noted in the following table. Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.

Blank ID	Analyte	Concentration	Action Level
Grinding Blank G1B180604012	sodium	481J ug/L/24.05 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg

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

Sample ID	Analyte	Q Flag	Q Code
all field samples	sodium	J	GBL

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-6SMI02TT-0211	antimony	all soil samples	34/35	J/UJ	MSL
	chromium		141/140	J	MSH
	potassium		126/124		

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

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all field samples	sodium	+J	J	GBL
all soil samples	antimony	+/-	J/UJ	MSL
all soil samples	chromium potassium	+	J	MSH

Hexavalent Chromium

Sample ID	Analyte	Results	Q flag	Q Code
No qualifications were required				

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B180604

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

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SM102TT-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL8Q
Matrix:	SOIL	**Lab Sample ID:**	G1B180604001
% Solids:	100.0	**Date/Time Collected:**	02/16/11 14:45
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	28700.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.0000			P
7440-39-3	Barium	70.2000			P
7440-41-7	Beryllium	0.7100	J		P
7440-43-9	Cadmium	0.2500	J		P
7440-70-2	Calcium	37300.000	~~B~~		P
7440-47-3	Chromium	42.0000		J MSH	P
7440-48-4	Cobalt	6.2000			P
7440-50-8	Copper	17.6000			P
7439-89-6	Iron	25100.000	~~B~~		P
7439-92-1	Lead	8.8000			P
7439-95-4	Magnesium	4760.0000			P
7439-96-5	Manganese	588.0000			P
7440-02-0	Nickel	12.1000			P
7440-09-7	Potassium	6320.0000		J MSH	P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	246.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	40.1000			P
7440-66-6	Zinc	24.1000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/28/11

Form 1 Analysis Data Sheet Equivalent

009

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-6SM101-0211
Lot Number:	G1B180604	Lab WorkOrder:	MEL8V
Matrix:	SOIL	Lab Sample ID:	G1B180604002
% Solids:	100.0	Date/Time Collected:	02/16/11 15:30
Units:	MG/KG	Date/Time Received:	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	30300.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	3.9000			P
7440-39-3	Barium	74.4000			P
7440-41-7	Beryllium	0.7300	J		P
7440-43-9	Cadmium	0.3000	J		P
7440-70-2	Calcium	23500.000	~~B~~		P
7440-47-3	Chromium	42.4000		J MSH	P
7440-48-4	Cobalt	6.6000			P
7440-50-8	Copper	16.3000			P
7439-89-6	Iron	25900.000	~~B~~		P
7439-92-1	Lead	10.1000			P
7439-95-4	Magnesium	4800.0000			P
7439-96-5	Manganese	763.0000			P
7440-02-0	Nickel	13.0000			P
7440-09-7	Potassium	6530.0000		J MSH	P
7782-49-2	Selenium	2.1000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	242.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	42.4000			P
7440-66-6	Zinc	27.2000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/28/11

Form 1 Analysis Data Sheet Equivalent

010

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI03-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL8W
Matrix:	SOIL	**Lab Sample ID:**	G1B180604003
% Solids:	100.0	**Date/Time Collected:**	02/16/11 12:25
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	42900.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	6.1000			P
7440-39-3	Barium	97.6000			P
7440-41-7	Beryllium	1.1000	J		P
7440-43-9	Cadmium	0.2800	J		P
7440-70-2	Calcium	14400.000	~~B~~		P
7440-47-3	Chromium	59.3000		J MSH	P
7440-48-4	Cobalt	8.4000			P
7440-50-8	Copper	21.7000			P
7439-89-6	Iron	37200.000	~~B~~		P
7439-92-1	Lead	11.9000			P
7439-95-4	Magnesium	5130.0000			P
7439-96-5	Manganese	851.0000			P
7440-02-0	Nickel	18.2000			P
7440-09-7	Potassium	7870.0000		J MSH	P
7782-49-2	Selenium	1.1000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	254.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.2600	J		P
7440-62-2	Vanadium	59.4000			P
7440-66-6	Zinc	39.2000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JLC 4/28/11

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-021711-SMI
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL8X
Matrix:	WATER	**Lab Sample ID:**	G1B180604004
% Solids:	0.0	**Date/Time Collected:**	02/17/11 6:45
Units:	UG/L	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	250.0000	U		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	250.0000	U		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

JAC 4281

012

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VBECA-6SMI02-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL81
Matrix:	SOIL	**Lab Sample ID:**	G1B180604005
% Solids:	100.0	**Date/Time Collected:**	02/16/11 14:45
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	27800.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MBL	P
7440-38-2	Arsenic	4.8000			P
7440-39-3	Barium	65.4000			P
7440-41-7	Beryllium	0.6600	J		P
7440-43-9	Cadmium	0.2300	J		P
7440-70-2	Calcium	32900.000	~~B~~		P
7440-47-3	Chromium	40.0000		J MSH	P
7440-48-4	Cobalt	5.9000			P
7440-50-8	Copper	16.0000			P
7439-89-6	Iron	23900.000	~~B~~		P
7439-92-1	Lead	7.6000			P
7439-95-4	Magnesium	4630.0000			P
7439-96-5	Manganese	552.0000			P
7440-02-0	Nickel	11.7000			P
7440-09-7	Potassium	6090.0000		J MSH	P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	233.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	38.4000			P
7440-66-6	Zinc	23.6000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/28/11

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI02T-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL82
Matrix:	SOIL	**Lab Sample ID:**	G1B180604006
% Solids:	100.0	**Date/Time Collected:**	02/16/11 14:45
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	30100.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.3000			P
7440-39-3	Barium	71.9000			P
7440-41-7	Beryllium	0.7400	J		P
7440-43-9	Cadmium	0.2500	J		P
7440-70-2	Calcium	32900.000	~~B~~		P
7440-47-3	Chromium	44.2000		J MSH	P
7440-48-4	Cobalt	6.4000			P
7440-50-8	Copper	17.3000			P
7439-89-6	Iron	26300.000	~~B~~		P
7439-92-1	Lead	9.5000			P
7439-95-4	Magnesium	4580.0000			P
7439-96-5	Manganese	580.0000			P
7440-02-0	Nickel	12.5000			P
7440-09-7	Potassium	6360.0000		J MSH	P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	227.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	41.5000			P
7440-66-6	Zinc	24.3000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JMC 4/28/11

014

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB02-021711-SMI
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL9Q
Matrix:	WATER	**Lab Sample ID:**	G1B180604007
% Solids:	0.0	**Date/Time Collected:**	02/17/11 11:25
Units:	UG/L	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	61.0000	J		P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	100.0000	U		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	102.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	250.0000	U		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JC 42811

015

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI07-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL9R
Matrix:	SOIL	**Lab Sample ID:**	G1B180604008
% Solids:	100.0	**Date/Time Collected:**	02/17/11 9:00
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	34800.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.6000			P
7440-39-3	Barium	82.2000			P
7440-41-7	Beryllium	0.8200	J		P
7440-43-9	Cadmium	0.2500	J		P
7440-70-2	Calcium	20200.000	~~B~~		P
7440-47-3	Chromium	48.9000		J MSH	P
7440-48-4	Cobalt	7.5000			P
7440-50-8	Copper	20.0000			P
7439-89-6	Iron	29200.000	~~B~~		P
7439-92-1	Lead	10.0000			P
7439-95-4	Magnesium	5310.0000			P
7439-96-5	Manganese	660.0000			P
7440-02-0	Nickel	15.5000			P
7440-09-7	Potassium	7900.0000		J MSH	P
7782-49-2	Selenium	2.4000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	257.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	44.2000			P
7440-66-6	Zinc	27.5000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JC 4/28/11

016

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI09-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL9T
Matrix:	SOIL	**Lab Sample ID:**	G1B180604009
% Solids:	100.0	**Date/Time Collected:**	02/17/11 10:25
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	11300.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.9000			P
7440-39-3	Barium	30.1000			P
7440-41-7	Beryllium	0.1500	J		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	99600.000	~~B~~		P
7440-47-3	Chromium	24.5000		J MSH	P
7440-48-4	Cobalt	3.1000	J		P
7440-50-8	Copper	15.7000			P
7439-89-6	Iron	10700.000	~~B~~		P
7439-92-1	Lead	2.7000	J		P
7439-95-4	Magnesium	28200.000			P
7439-96-5	Manganese	356.0000			P
7440-02-0	Nickel	8.0000			P
7440-09-7	Potassium	1650.0000		J MSH	P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	223.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	33.1000			P
7440-66-6	Zinc	20.2000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JMC 4/28/11

017

CH2M Hill Inc

Client Sample ID: VKECA-6SMI02TT-0211

General Chemistry

Lot-Sample #...: G1B180604-001 Work Order #...: MEL8Q Matrix.....: SOLID
Date Sampled...: 02/16/11 14:45 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:12 DL.....: 0.010

JBC
4/28/11

018

CH2M Hill Inc

Client Sample ID: VEECA-6SMI01-0211

General Chemistry

Lot-Sample #...: G1B180604-002 **Work Order #...:** MEL8V **Matrix.....:** SOLID
Date Sampled...: 02/16/11 15:30 **Date Received..:** 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:14 DL.....: 0.010

JAC 4/28/11

019

CH2M Hill Inc

Client Sample ID: VEECA-6SMI03-0211

General Chemistry

Lot-Sample #...: G1B180604-003 Work Order #...: MEL8W Matrix.....: SOLID
Date Sampled...: 02/16/11 12:25 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:15 DL.....: 0.010

QC 42811

CH2M Hill Inc

Client Sample ID: VREEA-EB01-021711-SMI

General Chemistry

Lot-Sample #...: G1B180604-004 **Work Order #...:** MEL8X **Matrix.....:** WATER
Date Sampled...: 02/17/11 06:45 **Date Received..:** 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/18/11	1053184

Dilution Factor: 1 Analysis Time..: 10:52 DL.....: 2.0

JLC 4/28/11

021

CH2M Hill Inc

Client Sample ID: VEECA-6SMI02-0211

General Chemistry

Lot-Sample #...: G1B180604-005 Work Order #...: MEL81 Matrix.....: SOLID
Date Sampled...: 02/16/11 14:45 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:16 DL.....: 0.010

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-6SMI02T-0211

General Chemistry

Lot-Sample #...: G1B180604-006 Work Order #...: MEL82 Matrix.....: SOLID
Date Sampled...: 02/16/11 14:45 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:17 DL.....: 0.010

JAC 4281

CH2M Hill Inc

Client Sample ID: VEECA-EB02-021711-SMI

General Chemistry

Lot-Sample #...: G1B180604-007 **Work Order #...:** MEL9Q **Matrix.....:** WATER
Date Sampled...: 02/17/11 11:25 **Date Received..:** 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/18/11	1053184

Dilution Factor: 1 Analysis Time..: 10:53 DL.....: 2.0

JLC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-6SMI07-0211

General Chemistry

Lot-Sample #...: G1B180604-008 Work Order #...: MEL9R Matrix.....: SOLID
Date Sampled...: 02/17/11 09:00 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:18 DL.....: 0.010

QC
4284

025

CH2M Hill Inc

Client Sample ID: VRRCA-6SMI09-0211

General Chemistry

Lot-Sample #...: G1B180604-009 **Work Order #...:** MEL9T **Matrix.....:** SOLID
Date Sampled...: 02/17/11 10:25 **Date Received..:** 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:19 DL.....: 0.010

JAC 4/28/11

Case Narrative

TestAmerica West Sacramento Project Number G1B180604

General Comments

The temperature of the temperature blanks was recorded as 0 degree Celsius (C). All samples listed on the chain of custody (COC) labeled "COOLER 1" were received at 1 degree C. Wet ice was used as a cooling agent.

The sample VEECA-EB01-021711-SMI was received at the laboratory past the recommended 24 hour holding time for hexavalent chromium.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Samples for analysis of all methods were processed by Incremental Sampling Method techniques (ISM) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

The data for the laboratory duplicate and triplicate are reported as samples 10 and 11 for all methods. The native sample is 9, client ID VEECA-6SM09-0211. The summaries for the replicates are reported on the Sample Triplicate Evaluation Report at the end of each summary section.

SOLID, 6010B, Metals
Samples: 1, 2, 3, 5, 6, 8, 9, 10, 11
The recoveries for aluminum, antimony, chromium, iron, potassium and manganese are outside the established control limits for the matrix spike/matrix spike duplicate (MS/MSD) associated with this batch. The concentrations of aluminum, calcium, chromium, iron, and manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable laboratory control sample (LCS) data demonstrate that the analytical system is in control.

Due to historical results, all of the samples were analyzed and reported at 5x dilutions.

The method blank for batch 1067186 has a detectable amount of Iron. There were also trace detections for aluminum and calcium. The method blank was reanalyzed and the initial result was confirmed. All of the associated samples have detections greater than 10x the value of the method blank.

An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -12.

Case Narrative

TestAmerica West Sacramento Project Number G1B180604

SOLID, 7196A, Hexavalent Chromium
Samples: 1, 2, 3, 5, 6, 8, 9, 10, 11
An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -12.

WATER, 7196A, Hexavalent Chromium
Sample: 4
The noted sample was received in the laboratory after the holding time for the test had expired. The samples were analyzed after consultation with the client.
Sampling date: 2/17/11 @ 06:45
Received date: 2/18/11
Hold time expiration date: 2/18/11
Analysis Date: 2/18/11

There are no other anomalies associated with this project.

Sample Summary

TestAmerica West Sacramento Project Number G1B180604

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEL8Q	1	VEECA-6SMI02TT-0211	2/16/2011 02:45 PM	2/18/2011 09:15 AM
MEL8V	2	VEECA-6SMI01-0211	2/16/2011 03:30 PM	2/18/2011 09:15 AM
MEL8W	3	VEECA-6SMI03-0211	2/16/2011 12:25 PM	2/18/2011 09:15 AM
MEL8X	4	VEECA-EB01-021711-SMI	2/17/2011 06:45 AM	2/18/2011 09:15 AM
MEL81	5	VEECA-6SMI02-0211	2/16/2011 02:45 PM	2/18/2011 09:15 AM
MEL82	6	VEECA-6SMI02T-0211	2/16/2011 02:45 PM	2/18/2011 09:15 AM
MEL9Q	7	VEECA-EB02-021711-SMI	2/17/2011 11:25 AM	2/18/2011 09:15 AM
MEL9R	8	VEECA-6SMI07-0211	2/17/2011 09:00 AM	2/18/2011 09:15 AM
MEL9T	9	VEECA-6SMI09-0211	2/17/2011 10:25 AM	2/18/2011 09:15 AM
MEL9V	10	VEECA-6SMI09-0211	2/17/2011 10:25 AM	2/18/2011 09:15 AM
MEL9W	11	VEECA-6SMI09-0211	2/17/2011 10:25 AM	2/18/2011 09:15 AM
MFD7L	12	Grinding Blank	2/17/2011 12:00 PM	2/18/2011 09:15 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B180604

G1B180604

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel. (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1376

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No: ECA-RI
Airbill number: 8736 9313 4171

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container Type
Preservatives

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) not for biaffaites	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-EB02-021711-SMI	02-17-11 1125	aq	2											x	x					
	VEECA-6SMI07-0211	02-17-11 0900	SMI	4		x															
	VEECA-6SMI09-0211	02-17-11 1025	SMI	4		x															

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time		Received By
	02/17/11 1330	FEDEX				
Relinquished By	Date/Time	Received By	Relinquished By	Date/Time		Received By

Order 3

TestAmerica West Sacramento (916) 373 - 5600

7 of 1094

030

G1B180604

G1B 180604

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth Contact: Victoria Weber	Contract: N62470-08-D-1000	Phone #: (757) 671-6208	Fax #: (773) 695-1378
Address: 5700 Cleveland St, Suite 101	City: Virginia Beach	State: VA	Zip Code: 23462
Project #: 406040.FI.PK.EC	Proj. Name/No.: ECA-RI		Airbill number: 8736 8330 8559
Bill (if different than above): CH2M HILL Inc, A/P	Address: PO Box 241329, Denver, CO 80224		
Sampler (Print/Sign): Dia Whitaker		Copies To:	

LAB USE ONLY

Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX | UPS | CLIENT
Temp Blank | Intact | Not Intact

Analysis and Container Preservatives

Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) not for duplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
Container				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	
Test America Supplied Label				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	
Preservative				4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	
VEECA-6SMI02TT-0211	02-16-11 1445	SMI	2		x															
VEECA-6SMI01-0211	02-16-11 1530	SMI	4		x															
VEECA-6SMI03-0211	02-16-11 1225	SMI	3		x															
VEECA-EB01-021711-SMI	02-17-11 0645	aq	2											x	x					

02/17/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By	Date/Time		Received By:
	02/17/11 1330	FEDEX				18 Feb 2011 9:40
Relinquished By:	Date/Time	Received By	Relinquished By:	Date/Time		Received By:

cooler 2

TestAmerica West Sacramento (916) 373 - 5600

1 of 3 4

031

8 of 1094

G1B180604

G1B180604

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swanfurth
Contact: Victoria Weber
Contract: N62470-08-D-1090
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FLFK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8736 9330 8548

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Samplers (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

Analysis and Container Type (Preservative)

					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) not for triplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
	VEECA-6SMI02-0211	02-16-11 1445	SMI	4		x															
	VEECA-6SMI02T-0211	02-16-11 1445	SMI	4		x															
	VEECA-6SMI02TT-0211	02-16-11 1445	SMI	2		x															

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/17/11 1330	Fedex				18 Feb 2011
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:

cooler 1

TestAmerica West Sacramento (916) 374 - 5600

032

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT Ch2MHill PM KS LOG # 6942 A

LOT# (QUANTIMS ID) G1B180604 QUOTE# 88113 LOCATION 4240

Checked (✓)

DATE RECEIVED 18 Feb 2011 TIME RECEIVED 9:15 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

CUSTODY SEAL STATUS ☐ INTACT ☐ BROKEN ☐ N/A ☑

SHIPPPING CONTAINER(S) ☐ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ See multi Cooler Sheet ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

BJ 18Feb2011

Initials Date

---

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

CV 02/18/11

Initials Date

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

033

QA-165 10/09 RKE, Page 1

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2MHill LOT# (QUANTIMS ID): G1B180604

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600188 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: Ø CORRECTED Ø ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): loose wet ice ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ # 5 ☐ ☐ OTHER ☑

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600191 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: Ø CORRECTED Ø ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 2 3 AVERAGE: 2 CORRECTED 2 ☑

SAMPLES / TESTS (IF NCM REQUIRED): loose wet ice ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

COOLER ID 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600186 ☑

COC #(S) NA

TEMPERATURE BLANK: OBSERVED: Ø CORRECTED Ø ☑

SAMPLE TEMPERATURE:

OBSERVED: 3 2 3 AVERAGE: 3 CORRECTED 3 ☑

SAMPLES / TESTS (IF NCM REQUIRED): loose wet ice ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

Initials: [illegible] Date: 18 feb 2014

034

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B180604

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ	4	4	3		4	4		4	4	4	4									
250AGJ																				
125AGJ																				
___CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn				1			1													
500PJna																				
500PJzn/na																				
250PJ				1			1													
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

035

G1B180604

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B180604

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2
			X					✓			✓	5	2/12/11											
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

	YES	NO	N/A
A.I.I **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓		
Legible?	✓		
Signature of sample custodian present?	✓		
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓		
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓		
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]		✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	___	✓
RAS/Non-RAS Case No.?	[___]	___	✓
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[✓]	___	___

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

(a) all analytes analyzed by ICP-AES?	___	[✓]	___
(b) all analytes analyzed by ICP-MS?	___	[✓]	___
(c) Mercury?	___	[ ]	✓
(d) Cyanide?	___	[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

Digestion Log for ICP-AES (Form XII)present?	[✓]	___	___
Digestion Log for ICP-MS (Form XII) present?	[✓]	___	___
Digestion Log for mercury (Form XII) present?	[ ]	___	✓
Distillation Log for cyanide (Form XII) present?	[ ]	___	✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[✓]		
Are percent solids calculations present for soils/sediments?	[ ]		✓
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[ ]	✓	
Cyanide?	[ ]		✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?	_	[_]	_✓
Mercury analysis(28 days) exceeded?	_	[_]	_✓
Other Metals analysis(180 days)exceeded?	_	_	[✓] _

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

Metals Analysis ≤ 2?	[✓]	_	_
Cyanide Analysis ≥ 12?	[_]	_	_✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]	_	_

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]		

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]		
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]		
Are results on Form I'S reported by correct significant figures?	[✓]		
Are soil sample results on Form I's corrected for percent solids? sample type - solids - not Soils	[ ]	✓	✓
Are all "less than MDL" values reported by the ~~CRQLs~~ LOD's per SAP and coded with "U"?	[✓]		
Are values less than the ~~CRQLs~~ LOD's per SAP but greater than or equal to the MDLs flagged with "J"?	[✓]		
Are appropriate contractual quality control and Method qualifiers used?	[✓]		

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓]

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B180604

3/8, 1802

ICP - AES	
SAMPLE ID	VEECA-6SMI02-0211
ANALYTE	cobalt
Lab Value CONCENTRATION (mg/Kg)	5.9
AMOUNT FROM RAW DATA (ug/ml)	0.023056
SAMPLE SIZE (g)	0.98
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	5.882

3/14, 12;32

ICP-MS	
SAMPLE ID	VEECA-6SMI01-0211
ANALYTE	selenium
Lab Value CONCENTRATION (mg/Kg)	2.1
AMOUNT FROM RAW DATA (ug/L)	4.033691
SAMPLE SIZE (g)	0.971
FINAL VOLUME (L)	0.05
DILUTION FACTOR	10
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	2.07708

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	___	___
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	___

Dilutions were performed as necessary - this was not noted on Form 1

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]	___	___
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]	___	___
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]	___	✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]	___	✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]	___	✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[ ]		✓
	Cyanide Analysis?	[ ]		✓
	ICP-AES(more than 2 point Calib.)?	[ ]		✓
	ICP-MS (more than 2 point calib.)?	[✓]		
	ACTION: If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ". **NOTE**: The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).			
A.1.12	**Initial and Continuing Calibration Verification- Form IIA**			
A.1.12.1	Present and complete for every metal and cyanide?	[✓]		
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[✓]		
	ACTION: If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.			
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]		
	ACTION: If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.			
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[ ]		✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note: CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.) per method	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? per SOP at beginning only [✓] ___ ___

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:19 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B160524_LLQS.pdf; G1B040475_LLQS.pdf; G1B230594_LLQS.pdf; G1B190434_LLQS.pdf; G1B180604_LLQS.pdf

Good afternoon Jackie,
Attached are the LLQS data for 5 of the projects. I'll send the others in following e-mails. Please note that the 6010 data is from instrument Thermo and PO5 and the 6020 data is from M01 & M02. The file name and time will on these forms will help you associate them back to the run logs. Please let me know if you have any questions.

I'll follow up with the production group on the status of the other forms you're awaiting – Explosives Form X equivalent and retention time windows forms.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 | Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%?	[___]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 Initial and Continuing Calibration Blanks - Form III

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___
Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by			

		YES	NO	N/A
	using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___
	ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".			
A.1.14.2	Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ ~~CRQL~~ LOD; > ~~CRQL~~ LOD			
A.1.14.2.1	When MDL < ~~CRQL~~ LOD, is any Calib. Blank value ≥ MDL but ≤ ~~CRQL~~ LOD?	✓	[___]	___
	ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the ~~CRQL~~ LOD with a "U". Do not qualify non-detects.			
A.1.14.2.2	When MDL < ~~CRQL~~ LOD, is any Calib. Blank value > ~~CRQL~~ LOD?	___	[✓]	___
	ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".			
A.1.14.2.3	Is any Calibration Blank value below the negative ~~CRQL~~ LOD?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated all associated sample results ≥ ~~CRQL~~ LOD but <10x~~CRQL~~ LOD.			
	NOTE: 1. For ICB that does not meet the technical QC Criteria, apply the action to all samples			

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B180604 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110309B2

Analyte	03/09/11 20:52 CCB 10	03/09/11 20:57 CCB 11	03/09/11 21:23 CCB 12
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	3.0 U	5	4
Thallium	1.5 U	1.5 U	1.5 U

no samples associated

Lot Number: G1B180604 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110309B2

Analyte	03/09/11 21:28 CCB 13	03/09/11 21:56 CCB 14	03/09/11 22:02 CCB 15
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	4	4	3.0 U
Thallium	1.5 U	1.5 U	1.5 U

Se not reported from this run - no quals were required.

-5, -6, -8, -9, -10, -11

Lot Number: G1B180604 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110309B2

Analyte	03/09/11 22:27 CCB 16
Arsenic	5.0 U
Selenium	6
Thallium	1.5 U

Se not reported from this run - no quals were required

-2, -3

U Result is less than the reporting limit (RL)

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run .

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J),but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ ~~CRQL~~ LOD, and

> ~~CRQL~~ LOD

A.1.15.2.1 When MDL < ~~CRQL~~ LOD, is any preparation blank value ≥ MDL but ≤ ~~CRQL?~~ LOD. ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C080000186B
Lot Number:	G1B180604	**Lab WorkOrder:**	MFA9W
Matrix:	SOIL	**Lab Sample ID:**	G1C080000186B
Instrument Id:	T01	**Analysis Date/Time:**	3/8/2011 5:36:00PM
Units:	MG/KG		6010B - all soils

Analyte	Concentration	C	Method	
Aluminum	6.2000	J	P	NQ
Antimony	2.0000	U	P	
Barium	0.5000	U	P	
Beryllium	0.1000	U	P	
Cadmium	0.1000	U	P	
Calcium	11.2000	J	P	NQ
Chromium	0.5000	U	P	
Cobalt	0.5000	U	P	
Copper	0.5000	U	P	
Iron	6.0000	J	P	NQ
Lead	0.5000	U	P	
Magnesium	10.0000	U	P	
Manganese	0.5000	U	P	
Nickel	0.5000	U	P	
Potassium	25.0000	U	P	
Silver	0.2000	U	P	
Sodium	25.0000	U	P	
Vanadium	0.5000	U	P	
Zinc	1.0000	U	P	

U Result is less than the reporting limit. (RL)
J Estimated Result. Result is less than RL.

all results in assoc. samples were >> blk level. no quals.

	YES	NO	N/A
but ≤ ~~CRQL~~ LOD to ~~CRQL~~ LOD with a "U".			
A.1.15.2.2 When the MDL ≤ ~~CRQL~~ LOD, is any Preparation Blank value greater than its ~~CRQL~~ LOD?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the ~~CRQL~~ LOD but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ ~~CRQL~~ LOD, replace it with ~~CRQL~~ LOD-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

*see Form 1 (next page) for action based on qualifying blk. The prep blk criteria was used.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

A.1.15.2.3 Is the Prep. Blank concentration below the negative ~~CRQL?~~ LOD.	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

A.1.15.2.4 When the MDL is greater than the LOD ~~CRQL~~, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	Grinding Blank
Lot Number:	G1B180604	**Lab WorkOrder:**	MFD7L
Matrix:	WATER	**Lab Sample ID:**	G1B180604012
% Solids:	0.0	**Date/Time Collected:**	02/17/11 12:00
Units:	UG/L	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	1090.0000			P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	285.0000	J		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	242.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	481.0000	J		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

no Quals *

no Quals *

no Quals *

flag J as noted in report

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

* all results in assoc. field samples were > blk level & > LOD.

CH2M Hill Inc

Client Sample ID: Grinding Blank

General Chemistry

Lot-Sample #...: G1B180604-012 Work Order #...: MFD7L Matrix.....: WATER
Date Sampled...: 02/17/11 12:00 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	03/08/11	1068330

Dilution Factor: 1 Analysis Time..: 14:09 DL.....: 2.0

gic
4/28/11

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]		
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]		
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]		
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]		
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[ ]		✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:	✓		
	For each matrix type?	[___]	___	___
	For each SDG?	[___]	___	___
	On one of the SDG samples?	[___]	___	___
	For each concentration range (i.e., low, med., high)?	[___]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[___]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	✓	[ ]	

ACTION:
If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.

for rinse blks - no action required there were only EB's present (only H_2O matrix)

A.1.17.3 Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.

	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[✓]		
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]		✓

NOTE:
Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.

PAC 5411

ACTION:
If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.

A.1.17.4 **Aqueous**

Are any spike recoveries:

(a) less than 30%?		[✓]	
(b) between 30-74%?		[✓]	
(c) between 126-150%?		[✓]	
(d) greater than 150%?		[✓]	

ACTION:
If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects

	YES	NO	N/A

as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.

(**NOTE**:Replace "N" with "J", "R" as appropriate.)

A.1.17.5 **Soil/Sediment**

6SMI02TT

Are any spike recoveries:

	YES	NO	N/A
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	✓	[___]	___
(d) greater than 200%?	* ✓	[___]	___

see form 5 for flags

* out due to abundance

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(**NOTE**:Replace "N" with "J" or "R" as appropriate.)

A.1.18 **Lab Duplicates) - Form VI**

A.1.18.1 Was the lab duplicate analysis performed:

MS/MSD - RPDs calculated

	YES	NO	N/A
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-6SMI02TT-0211
Lot Number:	G1B180604	**MS Lab Workorder:**	MEL8Q - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B180604001S
% Solids	100.0	**QC Batch ID:**	1067186
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	36100.0000	N	28700.0000	B	101.0000	7390.0	N	P	NQ
Antimony	80 - 120	10.2000	N	10.0000		25.2000	34.0	N	P	J/W
Barium	80 - 120	166.0000		70.2000		101.0000	95.0		P	
Beryllium	80 - 120	2.9800		0.7100	J	2.5200	90.0		P	
Cadmium	80 - 120	2.4200		0.2500	J	2.5200	86.0		P	
Calcium	80 - 120	40200.0000		37300.0000	B	2520.0000	114.0		P	
Chromium	80 - 120	56.2000	N	42.0000		10.1000	141.0	N	P	J/W
Cobalt	80 - 120	28.6000		6.2000		25.2000	89.0		P	
Copper	80 - 120	30.4000		17.6000		12.6000	101.0		P	
Iron	80 - 120	27000.0000	N	25100.0000	B	50.4000	3760.0	N	P	NQ
Lead	80 - 120	30.9000		8.8000		25.2000	88.0		P	
Magnesium	80 - 120	7520.0000		4760.0000		2520.0000	109.0		P	
Manganese	80 - 120	638.0000	N	588.0000		25.2000	201.0	N	P	NQ
Nickel	80 - 120	35.5000		12.1000		25.2000	93.0		P	
Potassium	80 - 120	9480.0000	N	6320.0000		2520.0000	126.0	N	P	J+
Silver	75 - 120	2.2300		1.0000		2.5200	87.0		P	
Sodium	80 - 120	2530.0000		246.0000	J	2520.0000	91.0		P	
Vanadium	80 - 120	66.6000		40.1000		25.2000	105.0		P	
Zinc	80 - 120	49.1000		24.1000		25.2000	100.0		P	

N Spike sample recovery is outside control limits.

Al, Fe & Mg - no qualifications required out due to abundance

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-6SMI02TT-0211
Lot Number:	G1B180604	**MS Lab Workorder:**	MEL8Q - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B180604001D
% Solids	100.0	**QC Batch ID:**	1067186
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	36000.0000	N	28700.0000	B	102.0000	7230.0	N	P	NQ
Antimony	80 - 120	10.5000	N	10.0000		25.4000	35.0	N	P	J/UJ
Barium	80 - 120	167.0000		70.2000		102.0000	96.0		P	
Beryllium	80 - 120	2.9900		0.7100	J	2.5400	90.0		P	
Cadmium	80 - 120	2.4400		0.2500	J	2.5400	86.0		P	
Calcium	80 - 120	40200.0000		37300.0000	B	2540.0000	115.0		P	J+
Chromium	80 - 120	56.2000	N	42.0000		10.2000	140.0	N	P	J+/UJ
Cobalt	80 - 120	28.6000		6.2000		25.4000	88.0		P	
Copper	80 - 120	30.2000		17.6000		12.7000	99.0		P	
Iron	80 - 120	27200.0000	N	25100.0000	B	50.8000	4010.0	N	P	NQ
Lead	80 - 120	30.8000		8.8000		25.4000	87.0		P	
Magnesium	80 - 120	7480.0000		4760.0000		2540.0000	107.0		P	
Manganese	80 - 120	638.0000	N	588.0000		25.4000	200.0	N	P	NQ
Nickel	80 - 120	35.4000		12.1000		25.4000	92.0		P	
Potassium	80 - 120	9480.0000	N	6320.0000		2540.0000	124.0	N	P	J+
Silver	75 - 120	2.3800		1.0000		2.5400	92.0		P	
Sodium	80 - 120	2540.0000		246.0000	J	2540.0000	91.0		P	
Vanadium	80 - 120	66.3000		40.1000		25.4000	103.0		P	
Zinc	80 - 120	48.5000		24.1000		25.4000	96.0		P	

N Spike sample recovery is outside control limits.

Al, Fe, & Mg - no qualifications required out due to abundance

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier)on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

all criteria were met

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[✓]	___
is any RPD ≥ 100%?	___	[✓]	___

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE:** Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

> ± CRQL?	___	[✓]	___
> ± 2xCRQL?	___	[✓]	___

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

no H2O field samples

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 20%?	___	[✓]	✓
is any RPD ≥ 100%?	___	[✓]	✓

X2 Com QC 5411

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

LAB DUPLICATE SAMPLE SUMMARY

Sample ID: VEECA-6SMI09-0211 (10)
Duplicate Sample ID: VEECA-6SMI09-0211 (11)

Analyte	Sample Conc.	Dup. Sample Conc.	%RPD
aluminum	11600	11300	3
arsenic	6	5.8	3
barium	30.3	30.1	1
cadmium	0.18	0.18	0
calcium	98200	101000	3
chromium	24.7	24.9	1
cobalt	3.1	3.1	0
copper	15.9	16	1
iron	10800	10600	2
lead	2.3	3	26
magnesium	28200	28900	2
manganese	354	358	1
nickel	8.5	8.1	5
potassium	1700	1670	2
selenium	2	1.8	11
sodium	222	223	0
vanadium	33.2	33.6	1
zinc	20	20.3	1

COMMENTS: Lab designated lab dup - not used to qualify samples - no impact on reported results.

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-6SMI09-0211
Lot Number:	G1B180604	Lab WorkOrder:	MEL9W
Matrix:	SOIL	Lab Sample ID:	G1B180604011
% Solids:	100.0	Date/Time Collected:	02/17/11 10:25
Units:	MG/KG	Date/Time Received:	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	11300.000	~~B~~		P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	5.8000			P
7440-39-3	Barium	30.1000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	101000.00	~~B~~		P
7440-47-3	Chromium	24.9000			P
7440-48-4	Cobalt	3.1000	J		P
7440-50-8	Copper	16.0000			P
7439-89-6	Iron	10600.000	~~B~~		P
7439-92-1	Lead	3.0000	J		P
7439-95-4	Magnesium	28900.000			P
7439-96-5	Manganese	358.0000			P
7440-02-0	Nickel	8.1000			P
7440-09-7	Potassium	1670.0000			P
7782-49-2	Selenium	1.8000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	223.0000	J		P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	33.6000			P
7440-66-6	Zinc	20.3000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JBC 4/28/11

070

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI09-0211
Lot Number:	G1B180604	**Lab WorkOrder:**	MEL9V
Matrix:	SOIL	**Lab Sample ID:**	G1B180604010
% Solids:	100.0	**Date/Time Collected:**	02/17/11 10:25
Units:	MG/KG	**Date/Time Received:**	02/18/11 9:15

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	11600.000	~~B~~		P
7440-36-0	Antimony	10.0000	U		P
7440-38-2	Arsenic	6.0000			P
7440-39-3	Barium	30.3000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.1800	J		P
7440-70-2	Calcium	98200.000	~~B~~		P
7440-47-3	Chromium	24.7000			P
7440-48-4	Cobalt	3.1000	J		P
7440-50-8	Copper	15.9000			P
7439-89-6	Iron	10800.000	~~B~~		P
7439-92-1	Lead	2.3000	J		P
7439-95-4	Magnesium	28200.000			P
7439-96-5	Manganese	354.0000			P
7440-02-0	Nickel	8.5000			P
7440-09-7	Potassium	1700.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	222.0000	J		P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	33.2000			P
7440-66-6	Zinc	20.0000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-6SMI09-0211

General Chemistry

Lot-Sample #...: G1B180604-010 Work Order #...: MEL9V Matrix.....: SOLID
Date Sampled...: 02/17/11 10:25 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:20 DL.....: 0.010

JC 4/28/11

CH2M Hill Inc

Client Sample ID: VKECA-6SMI09-0211

General Chemistry

Lot-Sample #...: G1B180604-011 Work Order #...: MEL9W Matrix.....: SOLID
Date Sampled...: 02/17/11 10:25 Date Received..: 02/18/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068333

Dilution Factor: 1 Analysis Time..: 14:20 DL.....: 0.010

JC 4/28/11

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

field triplicate was performed - see next page for analysis

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

no field dup

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

FIELD TRIPLICATE SAMPLE SUMMARY

Sample ID: VEECA-6SMI02-0211
Duplicate Sample ID: VEECA-6SMI02T-0211
Triplicate Sample ID: VEECA-6SMI02TT-0211

Water: RPD>30%
Soil: RPD>30%

Compound	Sample Conc.	Duplicate sample Conc.	Triplicate Sample Conc.	Standard Deviation	Avg	%RSD
aluminum	27800	30100	28700	1159.02	28866.67	4%
barium	65.4	71.9	70.2	3.37	69.17	5%
beryllium	0.66	0.74	0.71	0.04	0.70	5%
cadmium	0.23	0.25	0.25	0.01	0.24	5%
calcium	32900	32900	37300	2540.34	34366.67	7%
chromium	40	44.2	42	2.10	42.07	5%
cobalt	5.9	6.4	6.2	0.25	6.17	4%
copper	16	17.3	17.6	0.85	16.97	5%
iron	23900	26300	25100	1200.00	25100.00	5%
lead	7.6	9.5	8.8	0.96	8.63	11%
magnesium	4630	4580	4760	92.92	4656.67	2%
manganese	552	580	588	18.90	573.33	3%
nickel	11.7	12.5	12.1	0.40	12.10	3%
potassium	6090	6360	6320	145.72	6256.67	2%
sodium	233	227	246	9.71	235.33	4%
vanadium	38.4	41.5	40.1	1.55	40.00	4%
zinc	23.6	24.3	24.1	0.36	24.00	2%
arsenic	4.8	5.3	5	0.25	5.03	5%
thallium				#DIV/0!	#DIV/0!	#DIV/0!
selenium				#DIV/0!	#DIV/0!	#DIV/0!

COMMENTS: No qualifications required.

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓ ___
	> ± 4 x CRQL?	___	[___]	___

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS)- Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[___]	___	___
	Each batch samples digested/distilled?	[___]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[___]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

lab criteria were applied

Is any LCS recovery:	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[___]	___	___
	For each matrix type?	[___]	___	___
	For each concentration range (low or med.)?	[___]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	✓	[___]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

to assoc. with the 2 prep blks in the data pkg.

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(NOTE:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).			
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results) greater than the ~~CRQL~~ LOD but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the ~~CRQL~~ LOD but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ ~~CRQL~~ LOD, replace it with ~~CRQL~~ LOD-U.

If the Field Blank value is less than the

		YES	NO	N/A
	Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1	Is verification report present for:			
	Method Detection Limits (Form IX-Annually)?	[✓]	___	___
	ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
	ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1	Are MDLs present on Form IX for:			
	All the analytes?	[✓]	___	___
	All the instruments used?	[✓]	___	___
	Digested and undigested samples and Calib.Blanks?	[✓]	___	___
	ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[✓]	___
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[___]	___	✓
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 20-130 lab limits of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	___
Was the %RI for the two fold diluted sample within the acceptance limits (~~60-125%~~ 20-130 lab limits)?	[___]	___	___

dilutions were required as necessary.

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags**:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers**:
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/16, 2/17
Received Date: 2/18, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/8 soils
Analysis Dates: 3/8 soils; 2/18 waters

All holding time requirements were met with the exception of VEECA-EB01-021711-SMI which was analyzed 4 hours outside the analytical holding time of 24 hours. The reported result was qualified as estimated J/UJ.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-6SMI02TT-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No field duplicate pair was submitted in this SDG. However, triplicates were submitted. An assessment of the results is included in these worksheets.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the samples in this SDG. Clarification of the calculations was requested from the laboratory. No qualifications to the data were required.

Submitted field triplicate samples did not ~~resist~~ exhibit any positive results. JC 5/11

Reviewer JCleveland **Date:** 5/4/11

Hexavalent Chromium Calcs - ICAL soils - 3/8/11

X - Response	Y - Concentration (mg/L)
0	0
0.006	0.005
0.011	0.01
0.02	0.025
0.039	0.05
0.079	0.1

slope, m (A1) =	1.293599598
y-int, (A0) =	-0.001751323
r =	0.99910848
Rr2=	0.998217755

VEECA-6SMI02TT-0211 Lab Value - 0.219 mg/Kg

Response = 0.035

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.043524663 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg = mg/Kg

Sample Mass (g)	7.96
Sample FV (L)	0.04
Conversion Factor	1000

Concentration = 0.218716899 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B190434, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B190434. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-EB01-021811-DSS	G1B190434-007	water	X	X	X	X	X
VEECA-6SMI06-0211	G1B190434-005	soil			X	X	X
VEECA-6SMI10-0211	G1B190434-003	soil			X	X	X
VEECA-6SMI04-0211	G1B190434-001	soil			X	X	X
VEECA-6SMI08-0211	G1B190434-002	soil			X	X	X
VEECA-6SMI05-0211	G1B190434-004	soil			X	X	X
VEECA-6SMI04-0211 MS	G1B190434-001MS	soil			X	X	X
VEECA-6SMI04-0211 MSD	G1B190434-001MSD	soil			X	X	X

The following quality control samples were provided with this SDG: sample VEECA-EB01-021811-DSS- equipment blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- HPLC Performance *

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

• GC Performance	*
• ICP-MS Tuning	*
• Initial/Continuing Calibrations	*
• ICSA/ICSAB Standards	*
• LLQ Standards	*
• Blanks	
• Internal Standards	*
• Surrogate Recoveries	*
• Laboratory Control Samples	*
• Matrix Spike Recoveries	
• Matrix Duplicate RPDs	*
• Serial Dilutions	
• Field Duplicates	NA
• Field Triplicates	NA
• Identification/Quantitation	*
• Reporting Limits	*
• Tentatively Identified Compounds	NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications were required to the data.

Perchlorate

No qualifications were required to the data.

Metals

Qualification was required for one analyte due to contamination in the associated grinding blank. The Region II guidelines for qualifying samples based on method blanks were applied to the grinding blanks.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

The serial dilution analysis exhibited two non-compliant %Ds. Results were qualified as estimated for the non-compliant analytes.

Hexavalent Chromium

No qualifications to the data were required. Please note that some results were reported with a laboratory qualifier G. This is to indicate that the reporting limit has been raised due to observed matrix interference. These qualifiers have been crossed out and the results are reported as usable at the raised reporting limit without further qualification.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/17-18/11 and samples were received at the laboratory on 2/19/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Blanks

Metals

The associated grinding blank exhibited contamination as noted in the following table. Please note that sample weights and dilution factors were taken into consideration when applying the action level criteria.

Blank ID	Analyte	Concentration	Action Level
Grinding Blank – G1B190434008	sodium	331J ug/L/16.55 mg/Kg	Blank concentration up to 10 X blank level in mg/Kg (165.5 mg/Kg)

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

Sample ID	Analyte	Q Flag	Q Code
all soil samples	sodium	J	GBL

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for several analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-6SMI04-0211	antimony	all soil samples	39/41	J/UJ	MSL

Serial Dilutions

Metals

The serial dilution submitted in this SDG exhibited a non-compliant %D for two 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	Q Code
VEECA-6SMI04-0211	copper lead	all soil samples	14.89 17.29	J/UJ	SD

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B190434

Summary of Data Qualifications

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
all soil samples	sodium	+J	J	GBL
all soil samples	antimony	+/-	J/UJ	MSL
all soil samples	copper lead	+/-	J/UJ	SD

Hexavalent Chromium

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

CH2M HILL
Vieques, PR – ECA RI
SDG# G1B190434

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021811-DSS

HPLC

Lot-Sample #...: G1B190434-007 Work Order #...: MEMJW1A1 Matrix.....: WATER
Date Sampled...: 02/18/11 10:45 Date Received..: 02/19/11
Prep Date.....: 02/25/11 Analysis Date..: 02/26/11
Prep Batch #...: 1056066 Analysis Time..: 11:04
Dilution Factor: 0.97
Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	0.048 U	0.48	ug/L	0.024
1,3,5-Trinitrobenzene	0.048 U	0.097	ug/L	0.030
1,3-Dinitrobenzene	0.048 U	0.15	ug/L	0.048
2,4,6-Trinitrotoluene	0.048 U	0.15	ug/L	0.048
2,4-Dinitrotoluene	0.048 U	0.15	ug/L	0.048
2,6-Dinitrotoluene	0.048 U	0.15	ug/L	0.048
2-Amino-4,6-dinitrotoluene	0.097 U	0.29	ug/L	0.097
2-Nitrotoluene	0.097 U	0.97	ug/L	0.085
3-Nitrotoluene	0.097 U	0.48	ug/L	0.055
4-Amino-2,6-dinitrotoluene	0.048 U	0.15	ug/L	0.048
4-Nitrotoluene	0.097 U	0.97	ug/L	0.085
HMX	0.048 U	0.15	ug/L	0.035
Nitrobenzene	0.048 U	0.15	ug/L	0.048
Nitroglycerin	0.48 U	0.97	ug/L	0.32
PETN	0.48 U	0.97	ug/L	0.29
RDX	0.048 U	0.24	ug/L	0.035
Tetryl	0.048 U	0.15	ug/L	0.048

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	91	(84 - 125)

011

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021811-DSS

Dissolved HPLC

Lot-Sample #...: G1B190434-007 Work Order #...: MEMJWIA0 Matrix.....: WATER
Date Sampled...: 02/18/11 10:45 Date Received..: 02/19/11
Prep Date.....: 03/01/11 Analysis Date..: 03/02/11
Prep Batch #...: 1060188 Analysis Time..: 05:39
Dilution Factor: 1
Method.....: SW846 6850_DOD Ha

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.25 U	0.50	ug/L	0.082

MM 042111

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI06-0211
Lot Number:	G1B190434	**Lab WorkOrder:**	MEMJT
Matrix:	SOIL	**Lab Sample ID:**	G1B190434005
% Solids:	100.0	**Date/Time Collected:**	02/17/11 12:40
Units:	MG/KG	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	6960.0000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.8000			P
7440-39-3	Barium	39.3000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	123000.00	~~B~~		P
7440-47-3	Chromium	10.9000			P
7440-48-4	Cobalt	2.4000	J		P
7440-50-8	Copper	12.3000		J SD	P
7439-89-6	Iron	5980.0000	~~B~~		P
7439-92-1	Lead	1.3000	~~J~~	J SD	P
7439-95-4	Magnesium	6150.0000			P
7439-96-5	Manganese	364.0000			P
7440-02-0	Nickel	4.4000	J		P
7440-09-7	Potassium	1240.0000			P
7782-49-2	Selenium	1.5000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	178.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	15.7000			P
7440-66-6	Zinc	13.5000			P

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
J Estimated result. Result is less than RL.
Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SM110-0211
Lot Number:	G1B190434	**Lab WorkOrder:**	MEMJQ
Matrix:	SOIL	**Lab Sample ID:**	G1B190434003
% Solids:	100.0	**Date/Time Collected:**	02/17/11 14:45
Units:	MG/KG	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	5380.0000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	2.7000			P
7440-39-3	Barium	59.4000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.2500	J		P
7440-70-2	Calcium	158000.00	~~B~~		P
7440-47-3	Chromium	8.7000			P
7440-48-4	Cobalt	2.0000	J		P
7440-50-8	Copper	16.1000		J SD	P
7439-89-6	Iron	5860.0000	~~B~~		P
7439-92-1	Lead	2.5000	~~U~~	UJ SD	P
7439-95-4	Magnesium	11400.000			P
7439-96-5	Manganese	317.0000			P
7440-02-0	Nickel	3.9000	J		P
7440-09-7	Potassium	1060.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	163.0000	~~J~~	RJ GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	17.1000			P
7440-66-6	Zinc	23.5000			P

X1 corr
JAC
42811

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC
42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI04-0211
Lot Number:	G1B190434	**Lab WorkOrder:**	MEMH7
Matrix:	SOIL	**Lab Sample ID:**	G1B190434001
% Solids:	100.0	**Date/Time Collected:**	02/17/11 15:40
Units:	MG/KG	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	32300.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	4.1000			P
7440-39-3	Barium	70.4000			P
7440-41-7	Beryllium	0.7600	J		P
7440-43-9	Cadmium	0.2300	J		P
7440-70-2	Calcium	21300.000	~~B~~		P
7440-47-3	Chromium	37.1000			P
7440-48-4	Cobalt	6.7000			P
7440-50-8	Copper	10.5000		J SD	P
7439-89-6	Iron	25900.000	~~B~~		P
7439-92-1	Lead	9.2000		J SD	P
7439-95-4	Magnesium	5100.0000			P
7439-96-5	Manganese	544.0000			P
7440-02-0	Nickel	11.5000			P
7440-09-7	Potassium	7580.0000			P
7782-49-2	Selenium	1.2000	J		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	259.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	41.1000			P
7440-66-6	Zinc	25.3000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JLC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	Client Sample ID:	VEECA-6SMI08-0211
Lot Number:	G1B190434	Lab WorkOrder:	MEMJP
Matrix:	SOIL	Lab Sample ID:	G1B190434002
% Solids:	100.0	Date/Time Collected:	02/17/11 13:20
Units:	MG/KG	Date/Time Received:	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	5110.0000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	0.9800	J		P
7440-39-3	Barium	30.1000			P
7440-41-7	Beryllium	0.5000	U		P
7440-43-9	Cadmium	0.5000	U		P
7440-70-2	Calcium	102000.00	~~B~~		P
7440-47-3	Chromium	7.1000			P
7440-48-4	Cobalt	2.3000	J		P
7440-50-8	Copper	14.7000		J SD	P
7439-89-6	Iron	6020.0000	~~B~~		P
7439-92-1	Lead	4.0000	~~J~~	J SD	P
7439-95-4	Magnesium	8610.0000			P
7439-96-5	Manganese	205.0000			P
7440-02-0	Nickel	3.6000	J		P
7440-09-7	Potassium	1380.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	265.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5000	U		P
7440-62-2	Vanadium	15.2000			P
7440-66-6	Zinc	19.5000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-6SMI05-0211
Lot Number:	G1B190434	**Lab WorkOrder:**	MEMJR
Matrix:	SOIL	**Lab Sample ID:**	G1B190434004
% Solids:	100.0	**Date/Time Collected:**	02/17/11 15:00
Units:	MG/KG	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	15800.000	~~B~~		P
7440-36-0	Antimony	10.0000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	4.6000			P
7440-39-3	Barium	39.5000			P
7440-41-7	Beryllium	0.3200	J		P
7440-43-9	Cadmium	0.2300	J		P
7440-70-2	Calcium	43200.000	~~B~~		P
7440-47-3	Chromium	20.3000			P
7440-48-4	Cobalt	4.1000	J		P
7440-50-8	Copper	12.2000		J SD	P
7439-89-6	Iron	12400.000	~~B~~		P
7439-92-1	Lead	4.8000	~~J~~	J SD	P
7439-95-4	Magnesium	4560.0000			P
7439-96-5	Manganese	411.0000			P
7440-02-0	Nickel	7.3000			P
7440-09-7	Potassium	3810.0000			P
7782-49-2	Selenium	2.0000	U		P
7440-22-4	Silver	1.0000	U		P
7440-23-5	Sodium	238.0000	~~J~~	J GBL	P
7440-28-0	Thallium	0.5600	U		P
7440-62-2	Vanadium	24.7000			P
7440-66-6	Zinc	18.6000			P

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

Results and reporting limits have been adjusted for dry weight

JAC 42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-EB01-021811-DSS
Lot Number:	G1B190434	**Lab WorkOrder:**	MEMJW
Matrix:	WATER	**Lab Sample ID:**	G1B190434007
% Solids:	0.0	**Date/Time Collected:**	02/18/11 10:45
Units:	UG/L	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	359.0000			P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	10.0000	U		P
7440-39-3	Barium	5.0000	U		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	1680.0000			P
7440-47-3	Chromium	1.5000	J		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	324.0000	~~B~~		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	125.0000	J		P
7439-96-5	Manganese	11.4000			P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	145.0000	J		P
7782-49-2	Selenium	7.0000	~~JB~~		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	273.0000	~~J~~	J ~~B~~	P
7440-28-0	Thallium	5.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	10.0000	U		P

no val flag
JAC
42811

U Result is less than the reporting limit. (RL)

B Method blank contamination. Analyte detected at a reportable level in blank.

J Estimated result. Result is less than RL.

JAC
42811

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-6SMI04-0211

General Chemistry

Lot-Sample #...: G1B190434-001 Work Order #...: MEMH7 Matrix.....: SOLID
Date Sampled...: 02/17/11 15:40 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.12 U G	0.25	mg/kg	SW846 7196A	03/08/11	1068334

Dilution Factor: 5 Analysis Time..: 14:43 DL.....: 0.050

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JAC 42811

CH2M Hill Inc

Client Sample ID: VEECA-6SMI08-0211

General Chemistry

Lot-Sample #...: G1B190434-002 Work Order #...: MEMJP Matrix.....: SOLID
Date Sampled...: 02/17/11 13:20 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.12 U G	0.25	mg/kg	SW846 7196A	03/08/11	1068334

Dilution Factor: 5 Analysis Time..: 14:54 DL.....: 0.050

NOTE(S):

RL Reporting Limit

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

JLC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-6SMI10-0211

General Chemistry

Lot-Sample #...: G1B190434-003 Work Order #...: MEMJQ Matrix.....: SOLID
Date Sampled...: 02/17/11 14:45 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068334

Dilution Factor: 1 Analysis Time..: 14:25 DL.....: 0.010

JAC 4/28/11

CH2M Hill Inc

Client Sample ID: VEECA-GSMI05-0211

General Chemistry

Lot-Sample #...: G1B190434-004 Work Order #...: MEMJR Matrix.....: SOLID
Date Sampled...: 02/17/11 15:00 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.056	0.050	mg/kg	SW846 7196A	03/08/11	1068334

Dilution Factor: 1 Analysis Time..: 14:26 DL.....: 0.010

JC 42811

CH2M Hill Inc

Client Sample ID: VEECA-6SMI06-0211

General Chemistry

Lot-Sample #...: G1B190434-005 Work Order #...: MEMJT Matrix.....: SOLID
Date Sampled...: 02/17/11 12:40 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	0.025 U	0.050	mg/kg	SW846 7196A	03/08/11	1068334

Dilution Factor: 1 Analysis Time..: 14:27 DL.....: 0.010

JC 42811

CH2M Hill Inc

Client Sample ID: VEECA-EB01-021811-DSS

General Chemistry

Lot-Sample #...: G1B190434-007 Work Order #...: MEMJW Matrix.....: WATER
Date Sampled...: 02/18/11 10:45 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Hexavalent Chromium	5.0 U	10.0	ug/L	SW846 7196A	02/19/11	1053183

Dilution Factor: 1 Analysis Time..: 10:30 DL.....: 2.0

JLC
42811

Case Narrative

TestAmerica West Sacramento Project Number G1B190434

General Comments

Please note that the samples were received at 1 degree Celsius (C) with temperature blanks at 0 degrees C. Wet ice was used as a cooling agent.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

Samples for analysis of all methods were processed by Incremental Sampling Method techniques (ISM) per SOP SAC-QA-0028, Rev. 1 and the project specific work plan.

*The data for sample VEECA-4SB01-TTBB-0211 was reported in lab lot G1B230594. comment irrelevant to this SDG.

The client instructed the laboratory to change the collection time for sample VEECA-6SMI05-0211 from 14:35 to 15:00.

WATER, 6850/DOD Handbook, Perchlorate
Sample: 7
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: ME1QH1AC
SMCS: ME1QH1AD

WATER, 8330B, Nitroaromatics & Nitramines
Sample: 7
There was insufficient sample volume to prepare a matrix spike/matrix spike duplicate (MS/MSD) pair with this batch.

SOLID, 6010B/6020, Metals
Samples: 1, 2, 3, 4, 5
The recoveries for Aluminum, Antimony, Calcium, Chromium, Iron, Manganese and Potassium are outside the established control limits for the MS/MSD associated with this batch. The concentration of aluminum, calcium, iron, and manganese in the parent sample is greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

Case Narrative

TestAmerica West Sacramento Project Number G1B190434

SOLID, 6010B, Metals (Continued)
Samples: 1, 2, 3, 4, 5
Due to historical results all samples were analyzed and reported at a 5x dilution.

The method blank (MB) associated with this batch has a detection for Iron greater than the reporting limit. The MB was rerun and the results were confirmed however, all the sample results associated with this MB were 10X higher than the MB. There were also detections for Aluminum and Calcium below one half the reporting limit. This MB is acceptable and no further corrective action was performed.

An aqueous grinding blank was created by rinsing the mortar and pestle before each use and compositing the rinsate. The data has been reported as sample -8. Calcium was detected at a reportable level. There were also detections between the LOQ and DL for Barium, Potassium, Magnesium, Sodium and Zinc.

WATER, 6010B/6020, Metals
Sample: 7
The method blank associated with this extraction batch has Iron detected below one half the reporting limit (RL). Selenium is also detected at a level greater than one half the RL. The data has been flagged with a "B" qualifier.

SOLID, Hexavalent Chromium
Samples: 1, 2, 3, 4, 5, 7, 8
An aqueous grinding blank was created by rinsing the mortar and pestal before each use and compositing the rinsate. The data has been reported as sample -8.

There are no other anomalies associated with this project.

Sample Summary

TestAmerica West Sacramento Project Number G1B190434

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEMH7	1	VEECA-6SMI04-0211	2/17/2011 03:40 PM	2/19/2011 09:00 AM
MEMJP	2	VEECA-6SMI08-0211	2/17/2011 01:20 PM	2/19/2011 09:00 AM
MEMJQ	3	VEECA-6SMI10-0211	2/17/2011 02:45 PM	2/19/2011 09:00 AM
MEMJR	4	VEECA-6SMI05-0211	2/17/2011 03:00 PM	2/19/2011 09:00 AM
MEMJT	5	VEECA-6SMI06-0211	2/17/2011 12:40 PM	2/19/2011 09:00 AM
MEMJW	7	VEECA-EB01-021811-DSS	2/18/2011 10:45 AM	2/19/2011 09:00 AM
MEQR3	8	Grinding Blank	2/17/2011 12:00 PM	2/19/2011 09:00 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

G1B190434

G1B190434

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St. Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8736 8330 8629

Bill (if different than above): CH2M HILL Inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for triplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
1	VEECA-6SMI04-0211	02-17-11 1540	SMI	3																	
MS	VEECA-6SMI04-0211-MS	02-17-11 1540	SMI			3															MS/MSD
MSD	VEECA-6SMI04-0211-SD	02-17-11 1540	SMI																		MS/MSD
2	VEECA-6SMI08-0211	02-17-11 1320	SMI	4		4															
3	VEECA-6SMI10-0211	02-17-11 1445	SMI	3		3															

02/18/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/18/11 1300	FEDEX				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	2-19-11 915					

code 2

TestAmerica West Sacramento (916) 373 - 5600

7 of 1303

027

G1B190434

GIB190434 2

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Test America

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach State:VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8738 9330 8630

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX
Temp Blank

UPS
Intact

CLIENT
Not Intact

	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for duplicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
					2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)			1 of 16 Oz glass jar		2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
					Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area			Grain size		8330 water	6850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
					4°C, headspace			4°C, headspace			None		4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-6SMI05-0211	02-17-11 1435	SMI	4		4															
	VEECA-6SMI06-0211	02-17-11 1240	SMI	4		4															
	VEECA-6SB01-TDBR-0211	02-18-11 0830	sb	1																	See GIB230594

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/18/11 1300	Fedex				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	2-19-11 915					

cooler 1

TestAmerica West Sacramento (916) 373 - 5600

4-526

8 of 1303

028

G1B190434

3

G1B 190434

Test America

Test America West Sacramento
680 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-05-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 6700 Cleveland St, Suite 101
City: Virginia Beach
State: VA
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8738 9330 8640

Bill (if different than above): CH2M HILL inc. A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX	UPS	CLIENT
Temp Blank	Intact	Not Intact

Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for implicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)				1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area				Grain size	8330 water	8650 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
				4°C, headspace			4°C, headspace				None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	VEECA-EB01-021811-OSS	02-18-11 1045	aq	5								2	1	1	1					

02/18/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	02/18/11 1300	FEDEX				
Relinquished By:	Date/Time	Received By:	Relinquished By:	Date/Time		Received By:
	2-19-11 915					

coolers

TestAmerica West Sacramento (916) 373 - 5600

9 of 1303

029

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2M Hill PM K-S LOG # 69443

LOT# (QUANTIMS ID) G1B190434 QUOTE# 88113 LOCATION W21C

Checked (✓)

DATE RECEIVED 2-19-11 TIME RECEIVED 900 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

See temp. sheet

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

Initials CH Date 2-19-11

==========

pH MEASURED ☑ YES ☐ ANOMALY ☐ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☐ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials CH Date 2-19-11

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M HILL LOT# (QUANTIMS ID): G1B190434

Checked (✓)

COOLER ID 1 ☑
CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑
CUSTODY SEAL #(S) 600195, 600194 ☑
COC #(S) NA
SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑
TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑
SAMPLE TEMPERATURE:
OBSERVED: 1 0 1 AVERAGE: 1 CORRECTED 1 ☑
SAMPLES / TESTS (IF NCM REQUIRED): ☑
LABORATORY THERMOMETER ID:
IR UNIT: #4☑ #5☐ ☐ OTHER

COOLER ID 2 ☑
CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑
CUSTODY SEAL #(S) 600195, 600194 ☑
COC #(S) NA
SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑
TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑
SAMPLE TEMPERATURE:
OBSERVED: 1 1 2 AVERAGE: 1 CORRECTED 1 ☑
SAMPLES / TESTS (IF NCM REQUIRED): ☑
LABORATORY THERMOMETER ID:
IR UNIT: #4☑ #5☐ ☐ OTHER ☑

COOLER ID 3 ☑
CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑
CUSTODY SEAL #(S) 600200, 600199 ☑
COC #(S) NA
SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑
TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑
SAMPLE TEMPERATURE:
OBSERVED: 1 1 1 AVERAGE: 1 CORRECTED 1 ☑
SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:
IR UNIT: #4☑ #5☐ ☐ OTHER ☑

CK 2-14-11
Initials Date

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B190434

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB							2													
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ	2																			
500AGJ	1	4	3	4	4															
250AGJ						4														
125AGJ																				
___CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn							1													
500PJna																				
500PJzn/na																				
250PJ							2													
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

G1B190434

TestAmerica

West Sacramento
Sample Receiving Preservation Check

Lot ID: G1B190434

Instructions: Check or x the container type, then check or x the pH measurement if it meets. Write the actual pH if out.

Container					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AGBs	AGBh	250AG Bs	500PJn	250PJn	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2	pH ≤2
			X								X													
500PJ na	500PJ zn/na	250PJ na	250PJ zn/na		pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2	pH ≥2

TestAmerica West Sacramento (916) 373-5600

MEMORANDUM **CH2MHILL**

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: March 4, 2011

This memo is to document corrections made to the Chains of Custody (COC) and laboratory log-ins for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

~~G1B120440~~
G1C040608

Sample ID	Analysis	Date	Time
VEECA-5SD01-000H-0211	TOC – Lloyd Kohn	2/10/2011	09:30
VEECA-5SD02-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:00
VEECA-5SD03-000H-0211	TOC – Lloyd Kohn	2/10/2011	11:05
VEECA-5SD04-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:45
VEECA-5SD05-000H-0211	TOC – Lloyd Kohn	2/9/2011	13:20
VEECA-5SD06-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:05
VEECA-5SD07-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:25
VEECA-5SD08-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:00
VEECA-5SD09-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:20
VEECA-5SD10-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:25
VEECA-5SD11-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:55
VEECA-5SD12-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:00
VEECA-5SD13-000H-0211	TOC – Lloyd Kohn	2/10/2011	16:00
VEECA-5SD14-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:25
VEECA-5SD15-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:35

The following samples need updated sample IDs, dates, and/or times:

G1B100573-5
G1B120440+C040608

Current Sample ID	Current Date	Correct Date	Lab Sample ID
VEECA-EB01-020911-SW	2/9/2011	07:00	MEAFV
VEECA-5SD01-000H-0211	2/10/11	09:30	MEDMQ
VEECA-5SD02-000H-0211	2/10/11	09:00	MEDMR
VEECA-5SD02P-000H-0211	2/10/11	09:00	MEDNM

17

VBO/CTF_030411_VW.DOC

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

G1B120440 +
J1C040608

	VEECA-5SD03-000H-0211	2/10/11	11:05	MEDMT	
	VEECA-5SD04-000H-0211	2/10/11	10:45	MEDMV	
	VEECA-5SD05-000H-0211	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-MS	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-SD	2/10/11	13:20	MEDMW	
	VEECA-5SD06-000H-0211	2/10/11	14:05 OK	MEDMX	
	VEECA-5SD07-000H-0211	2/10/11	14:25 (10:15)	MEDM0	
	VEECA-5SD08-000H-0211	2/10/11	15:00 (10:30)	MEDM1	
	VEECA-5SD09-000H-0211	2/10/11	12:20 (12:30)	MEDM2	
	VEECA-5SD10-000H-0211	2/10/11	10:25 (11:30)	MEDM3	
	VEECA-5SD11-000H-0211	2/10/11	09:55	MEDM4	
	VEECA-5SD11P-000H-0211	2/10/11	09:55	MEDNJ	7.16
	VEECA-5SD12-000H-0211	2/10/11	12:00	MEDM5	
	VEECA-5SD13-000H-0211	2/10/11	16:00	MEDNF	
	VEECA-5SD14-000H-0211	2/10/11	15:25	MEDNG	
	VEECA-5SD15-000H-0211	2/10/11	15:35	MEDNH	
1B100573-2	VEECA-5SW02-0211	2/9/11	10:10	MEAFQ	✓
-6	VEECA-5SW04-0211	2/9/11	11:35	MEAFW	✓
	VEECA-5SW04-0211-MS	2/9/11	11:35	MEAFW	✓
-5	VEECA-EB01-020911-SW	2/9/11	07:00	MEAFV	✓
G1B196434-4	VEECA-6SMI05-0211	2/17/11	15:00	MEMJR	✓
1B230594-1	VEECA-4SB01-001H-0211 *	2/18/11	08:30	MEQ97	✓
1B040475-2	VEECA-4SMI02-0211 ✓	2/2/11 ✓	11:00 ✓	MD3CL	✓

* from VEECA-4SB01-TTBB-0211

COPYRIGHT 2011 BY CH2M HILL, INC. · COMPANY CONFIDENTIAL

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B190434

LAB: Test America- West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [✓] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [ ] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ [✓]

Are the chromatograms free of interferences? [ ] ___ [✓]

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

S – 2/18/11 P – 2/25
R – 2/19 A – 2/26

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ ✓ ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

listed on Form 1

a. Water/Waste [✓] ___ ___

b. Soil/Solid [ ] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices?

on Form 1

a. Water [✓] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [ ] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, only std dev + value [ ] ___ [✓]

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

No MS/MSD

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [ ] ___ ✓

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [ ] ___ ✓

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ✓

b. Waste [ ] ___ ✓

c. Soil/Solid [ ] ___ ✓

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [ ] ___ ✓

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [ ] ___ ✓

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [ ] ___ ✓

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

Soil
___out of _

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

Soil
__out of__

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? [✓] ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? [✓] ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? [✓] ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ [✓] ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ [ ] [✓]

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

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

only QC blk in SDG

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓

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

only QC blk in SDG

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [✓] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi Hydro RP C18

column 2: Synergi Hydro RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [ ] ___ [✓]

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? [ ] [✓] ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? [✓] ___ ___

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs) must be < 20.0% for all analytes). [✓] ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? [✓] ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence [✓] ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ [✓] ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ [✓]

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? See below [ ] [✓] ___

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] [✓] ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ [✓]

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

Not provided w/ daily RTW
Data Validator checked Cal in sequence and compared RT to check stability
-OK

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ✓ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ✓ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ✓ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [✓] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [ ] ___ ___

18.0 Nitroaromatics and Nitramines Identification

No ⊕

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ [✓]

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%	none
26-70%	"J"
71-100%	"NJ"
101-200% (No Interference)	"R"
101-200% (Interference detected)**	"NJ"
>50% (Analyte value is <CRQL)	"U"
>200%	"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] ___ [✓]

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:46	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.16	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27								
28								
29								
30								
31								

MS 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
METHOD ID: 8330
COLUMN PHASE: Zorbax CN
DIMENSIONS: 250 x 4.6mm 5u
COLUMN SN: USJT010289
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/18/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.106	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
26								
26								
27								
28	mr 5/6/11							
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/18/11
Received Date: 2/19/11
Prep Date: 3/1/11
Analysis Dates: 3/2/11
Cooler Temp: 1°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
= RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

No contamination was noted in the method and/or grinding blanks - no qualifications required. Associated QC blanks were: VEECA-EB02-021711-SM1 (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was not submitted for this data package.

Field Duplicate Sample

A field duplicate was not submitted for this data package.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data was verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer_____ **Date:** 4/21/11

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]	___	✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]	___	✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]	___	✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]	___	___
Legible?	[✓]	___	___
Signature of sample custodian present?	[✓]	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	[✓]	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	[✓]	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]	___	✓

not CLP

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[___]	___	✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A	
Is the SDG Narrative present?	[✓]	___	___	
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓	not CLP
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓	↓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A	
Laboratory Name?	[✓]	___	___	
Laboratory Code?	[___]	✓	✓	
RAS/Non-RAS Case No.?	[___]	✓	✓	
SDG No.?	[✓]	___	X	xlcom JPC 4281

	YES	NO	N/A
Contract No.?	[ ]	✓	

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?		[ ]	✓
(d) Cyanide?		[ ]	✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?	[ ]		✓
Distillation Log for cyanide (Form XII) present?	[ ]		✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	✓		
Are percent solids calculations present for soils/sediments? values present - not validated	✓		
Are preparation dates present on the sample preparation logs/bench sheets?	✓		

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	✓		
ICP-MS?	✓		
Mercury?		✓	
Cyanide?			✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	✓		
Properly labeled?	✓		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	✓		
Instrument Printouts?	✓		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1	Cyanide distillation(14 days)exceeded?		[ ]	✓
	Mercury analysis(28 days) exceeded?		[ ]	✓
	Other Metals analysis(180 days)exceeded?	✓	[ ]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2	Is pH of aqueous samples for:			
	Metals Analysis ≤ 2?		✓	
	Cyanide Analysis ≥ 12?		[ ]	✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3	Is the cooler temperature ≤ 10 C°?		✓	

ACTION:
If cooler temperature is >10 °C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the ~~CRQL~~s and coded with "U"? LOD's per client SAP	[✓]	___	___
Are values less than the ~~CRQLs~~ LOD's but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]		✓

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	[✓]		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	[✓]		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

	YES	NO	N/A
Mercury Analysis?	[___]	___	✓
Cyanide Analysis?	[___]	___	✓
ICP-AES(more than 2 point Calib.)?	[___]	___	✓
ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

	YES	NO	N/A
A.1.12.1 Present and complete for every metal and cyanide?	[✓]	___	___
Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

	YES	NO	N/A
A.1.12.2 Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

	YES	NO	N/A
A.1.12.3 Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

	YES	NO	N/A
Metals - 90-110%R?	[✓]	___	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

per SOP at beginning only

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland (cleve137@charter.net)
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:19 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B160524_LLQS.pdf; G1B040475_LLQS.pdf; G1B230594_LLQS.pdf; G1B190434_LLQS.pdf; G1B180604_LLQS.pdf

Good afternoon Jackie,
Attached are the LLQS data for 5 of the projects. I'll send the others in following e-mails. Please note that the 6010 data is from instrument Thermo and PO5 and the 6020 data is from M01 & M02. The file name and time will on these forms will help you associate them back to the run logs. Please let me know if you have any questions.

I'll follow up with the production group on the status of the other forms you're awaiting – Explosives Form X equivalent and retention time windows forms.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? in associated stds	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data** are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[✓]	___	___

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

A.1.14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?	✓	[___]	___

no quals required
see form 3 notes

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?	___	[✓]	___

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

CH2M Hill Inc

Initial and Continuing Calibration Blank

Lot Number: G1B190434 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110309B2

Analyte	03/09/11 20:52 CCB 10	03/09/11 20:57 CCB 11	03/09/11 21:23 CCB 12
Arsenic	5.0 U	5.0 U	5.0 U
Selenium	3.0 U	5	4
Thallium	1.5 U	1.5 U	1.5 U

001 1:5
002
003

Lot Number: G1B190434 **Instrument Id:** M02

Units: ug/L **Datafile Name:** 110309B2

Analyte	03/09/11 21:28 CCB 13	03/09/11 21:56 CCB 14
Arsenic	5.0 U	5.0 U
Selenium	4	4
Thallium	1.5 U	1.5 U

004 1:5
005

No Quals - only As & Tl reported from this run

U Result is less than the reporting limit (RL)

	YES	NO	N/A

reported from the analytical run.
2 For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[✓]	___	___
Each matrix type?	[✓]	___	___
All instruments used for metals and cyanide analyses?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

No Quals due to prep blks but quals due to grinding blank applied - see report.

ACTION:
If yes, change sample result ≥ MDL

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C010000241B
Lot Number:	G1B190434	**Lab WorkOrder:**	ME111
Matrix:	WATER	**Lab Sample ID:**	G1C010000241B
Instrument Id:	T01	**Analysis Date/Time:**	3/1/2011 5:19:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Aluminum	100.0000	U	P
Antimony	20.0000	U	P
Barium	5.0000	U	P
Beryllium	1.0000	U	P
Cadmium	1.0000	U	P
Calcium	250.0000	U	P
Chromium	5.0000	U	P
Cobalt	5.0000	U	P
Copper	5.0000	U	P
Iron	20.9000	J	P
Lead	5.0000	U	P
Magnesium	100.0000	U	P
Manganese	5.0000	U	P
Nickel	5.0000	U	P
Potassium	250.0000	U	P
Silver	2.0000	U	P
Sodium	250.0000	U	P
Vanadium	5.0000	U	P
Zinc	10.0000	U	P

No Quals - all Fe is greater than action limit for flags

U Result is less than the reporting limit. (RL)

J Estimated Result. Result is less than RL.

Form 3 Prep Blank Equivalent

CH2M Hill Inc
Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C010000287B
Lot Number:	G1B190434	**Lab WorkOrder:**	ME2A3
Matrix:	WATER	**Lab Sample ID:**	G1C010000287B
Instrument Id:	M02	**Analysis Date/Time:**	3/8/2011 1:31:00PM
Units:	UG/L		

Analyte	Concentration	C	Method
Selenium	2.5000	J	P

U Result is less than the reporting limit. (RL)
J Estimated Result. Result is less than RL.
Estimated Result. Result is less than RL.

QC blks only assoc - no qnals required

Form 3 Prep Blank Equivalent

	YES	NO	N/A
but ≤ ~~CRQL~~ LOD to ~~CRQL~~ LOD with a "U".			
A.1.15.2.2 When the MDL ≤ ~~CRQL,~~ LOD is any Preparation Blank value greater than its ~~CRQL~~ LOD?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[___]	✓
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the ~~CRQL~~ LOD but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ ~~CRQL,~~ LOD replace it with ~~CRQL~~ LOD-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

See following page for notes on grinding blank action

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
A.1.15.2.3 Is the Prep. Blank concentration below the negative ~~CRQL~~ LOD?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10x~~CRQL~~ LOD. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
A.1.15.2.4 When the MDL is greater than the LOD ~~CRQL~~, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

CH2M Hill Inc
Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	Grinding Blank
Lot Number:	G1B190434	**Lab WorkOrder:**	MEQR3
Matrix:	WATER	**Lab Sample ID:**	G1B190434008
% Solids:	0.0	**Date/Time Collected:**	02/17/11 12:00
Units:	UG/L	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	100.0000	U		P
7440-36-0	Antimony	20.0000	U		P
7440-38-2	Arsenic	2.0000	U		P
7440-39-3	Barium	2.8000	J		P
7440-41-7	Beryllium	1.0000	U		P
7440-43-9	Cadmium	1.0000	U		P
7440-70-2	Calcium	920.0000			P
7440-47-3	Chromium	5.0000	U		P
7440-48-4	Cobalt	5.0000	U		P
7440-50-8	Copper	5.0000	U		P
7439-89-6	Iron	50.0000	U		P
7439-92-1	Lead	5.0000	U		P
7439-95-4	Magnesium	246.0000	J		P
7439-96-5	Manganese	5.0000	U		P
7440-02-0	Nickel	5.0000	U		P
7440-09-7	Potassium	159.0000	J		P
7782-49-2	Selenium	2.5000	U		P
7440-22-4	Silver	2.0000	U		P
7440-23-5	Sodium	331.0000	J		P
7440-28-0	Thallium	1.0000	U		P
7440-62-2	Vanadium	5.0000	U		P
7440-66-6	Zinc	4.9000	J		P

NQ <LOD (5)

NQ >LOD (250) >10X level in blk

NQ >LOD (100) >10X Level in blk

NQ <LOD (250) >10X level in blk (250) >LOD

✓ flags rqd

~~>10X level in blk. except in 6SMF10~~

xl corr JAC 42811 (10)

NQ <LOD >10X level in blk

U Result is less than the reporting limit. (RL)

J Estimated result. Result is less than RL.

JAC 42811

Form 1 Analysis Data Sheet Equivalent

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples?	[✓]	___	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[ ]		✓

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation] -Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]		
	For each SDG?	[✓]		
	On one of the SDG samples?	[✓]		
	For each concentration range (i.e., low, med., high)?	[✓]		
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]		
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]		

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-6SMI04-0211
Lot Number:	G1B190434	**MS Lab Workorder:**	MEMH7 - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B190434001S
% Solids	100.0	**QC Batch ID:**	1067195
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	37400.0000	N	32300.0000	B	101.0000	5100.0	N	P	NQ *
Antimony	80 - 120	10.8000	N	10.0000		25.3000	39.0	N	P	J/UJ
Barium	80 - 120	164.0000		70.4000		101.0000	92.0		P	
Beryllium	80 - 120	3.0000		0.7600	J	2.5300	89.0		P	
Cadmium	80 - 120	2.3800		0.2300	J	2.5300	85.0		P	
Calcium	80 - 120	24300.0000		21300.0000	B	2530.0000	120.0		P	
Chromium	80 - 120	48.3000		37.1000		10.1000	110.0		P	
Cobalt	80 - 120	28.8000		6.7000		25.3000	87.0		P	
Copper	80 - 120	21.9000		10.5000		12.7000	90.0		P	
Iron	80 - 120	27100.0000	N	25900.0000	B	50.6000	2320.0	N	P	NQ *
Lead	80 - 120	31.1000		9.2000		25.3000	87.0		P	
Magnesium	80 - 120	7600.0000		5100.0000		2530.0000	99.0		P	
Manganese	80 - 120	581.0000	N	544.0000		25.3000	150.0	N	P	NQ *
Nickel	80 - 120	34.0000		11.5000		25.3000	89.0		P	
Potassium	80 - 120	10400.0000		7580.0000		2530.0000	112.0		P	
Silver	75 - 120	2.2400		1.0000		2.5300	88.0		P	
Sodium	80 - 120	2510.0000		259.0000	J	2530.0000	89.0		P	
Vanadium	80 - 120	65.1000		41.1000		25.3000	95.0		P	
Zinc	80 - 120	48.2000		25.3000		25.3000	91.0		P	

N Spike sample recovery is outside control limits.

* No Quals required - out due to abundance

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-6SMI04-0211
Lot Number:	G1B190434	**MS Lab Workorder:**	MEMH7 - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B190434001D
% Solids	100.0	**QC Batch ID:**	1067195
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	38600.0000	N	32300.0000	B	102.0000	6180.0	N	P	NQ*
Antimony	80 - 120	11.5000	N	10.0000		25.4000	41.0	N	P	J/UJ
Barium	80 - 120	166.0000		70.4000		102.0000	94.0		P	
Beryllium	80 - 120	3.0600		0.7600	J	2.5400	90.0		P	
Cadmium	80 - 120	2.3900		0.2300	J	2.5400	85.0		P	
Calcium	80 - 120	24700.0000	N	21300.0000	B	2540.0000	134.0	N	P	NQ MS OK
Chromium	80 - 120	49.8000	N	37.1000		10.2000	125.0	N	P	
Cobalt	80 - 120	29.1000		6.7000		25.4000	88.0		P	
Copper	80 - 120	22.4000		10.5000		12.7000	94.0		P	
Iron	80 - 120	27600.0000	N	25900.0000	B	50.9000	3360.0	N	P	NQ*
Lead	80 - 120	31.6000		9.2000		25.4000	88.0		P	
Magnesium	80 - 120	7800.0000		5100.0000		2540.0000	106.0		P	
Manganese	80 - 120	593.0000	N	544.0000		25.4000	195.0	N	P	NQ*
Nickel	80 - 120	34.5000		11.5000		25.4000	90.0		P	
Potassium	80 - 120	10700.0000	N	7580.0000		2540.0000	121.0	N	P	NQ MS OK
Silver	75 - 120	2.3500		1.0000		2.5400	92.0		P	
Sodium	80 - 120	2550.0000		259.0000	J	2540.0000	90.0		P	
Vanadium	80 - 120	66.8000		41.1000		25.4000	101.0		P	
Zinc	80 - 120	49.5000		25.3000		25.4000	95.0		P	

N Spike sample recovery is outside control limits.

*No Quals - out due to abundance

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___
	ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.			
A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations? **NOTE:** Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.	[___]	✓	___
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___
	ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.			
A.1.17.4	**Aqueous**			
	Are any spike recoveries:			
	(a) less than 30%?	___	[___]	✓
	(b) between 30-74%?	___	[___]	___
	(c) between 126-150%?	___	[___]	___
	(d) greater than 150%?	___	[___]	✓
	ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects			

see Forms following this page.

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(NOTE:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	* ✓	[___]	___
(d) greater than 200%?	* ✓	[___]	___

ACTION:
If yes for any of the above, proceed as follows:

If the matrix spike recovery is less than 10%, reject (R) and red-line all associated data (detects & non-detects); if between 10-74%, qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL.
(NOTE:Replace "N" with "J" or "R" as appropriate.)

* No spikes required for several analytes - they were out due to abundance.

	YES	NO	N/A
A.1.18 **Lab Duplicates) - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[✓]	___	___
For each matrix type?	[✓]	___	___
For each concentration range (low or med.)?	[✓]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[✓]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[___]	✓
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	✓
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

X1 COM JAC 42811

RPD's calculated between MS/MSD

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE:** Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

RPD's calculated between MS/MSD

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R)and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL(substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	✓
> ± 2 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	✓	___

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

A.1.19.5 Circle on each Appendix A.4 all values that have:

RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 35% but < 120%?	___	[___]	✓
is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS) - Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	___
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A
more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).			

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

	YES	NO	N/A
Less than 50%?	___	[✓]	___
Between 50% and 79%?	___	[✓]	___
Between 121% and 150%?	___	[✓]	___
Greater than 150%?	___	[✓]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

	YES	NO	N/A
Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** **NOTE**: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each matrix type?	[✓]	___	___
	For each concentration range (low or med.)?	[✓]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

ICP SERIAL DILUTIONS

Lab Name:	TestAmerica West Sacramento	**MS Lab Workorder:**	MEMH7P25
Lot Number:	G1B190434	**MS Lab Sample ID:**	G1B190434001
Matrix:	SOIL	**QC Batch ID:**	1067195
Instrument Id:	T01	**Analysis Date/Time:**	3/8/2011 6:29:19PM
Concentration Units:	UG/L	**Method:**	6010B

Analyte	Initial Sample Result	C	Serial Dilution Result	C	% Difference	Q	M	
Aluminum	633841.7200		658450.0508		3.88		P	
Antimony	20.9500	U	37.7500	U			P	
Barium	1383.3041		1440.2501		4.12		P	
Beryllium	14.9001	J	14.2500	J	4.36		P	
Cadmium	4.4999	J	5.0000	U			P	
Calcium	418194.5200		435649.9628		4.17		P	
Chromium	729.5082		755.0001		3.49		P	
Cobalt	131.6508		141.2500	J	7.29		P	
Copper	205.8468		236.5000	J	14.89	E	P	07 US
Iron	508558.1600		534425.0220		5.09		P	
Lead	179.9004		211.0000	J	17.29	E	P	07 US
Magnesium	100150.2520		105357.5034		5.20		P	
Manganese	10674.5364		11089.5001		3.89		P	
Nickel	226.0957		242.5000	J	7.26		P	
Potassium	148849.5960		154475.0026		3.78		P	
Silver	0.0500	U	0.5000	U			P	
Sodium	5095.5980		5518.5002	J	8.30		P	
Vanadium	807.6950		824.7502		2.11		P	
Zinc	497.0491		521.2501		4.87		P	

JAC 042811

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[✓]	___	___
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	✓	[___]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.	See Form following this one		
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[✓]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[✓]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved (or inorganic) concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[✓]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

		YES	NO	N/A
A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	___	[✓]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).	VEECA-EB02-021711-SM1 is associated rinse blank		
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results) greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A
Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.			

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]		
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]		
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]		

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]		
All the instruments used?	[✓]		
Digested and undigested samples and Calib.Blanks?	[✓]		
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[ ]		✓

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	✓
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

dilutions were performed as necessary

	YES	NO	N/A
0.1 amu for each isotope in the tuning solution?	[✓]	___	___
Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 **ICP-MS Internal Standards - Form XV**

	YES	NO	N/A
A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

	YES	NO	N/A
A.1.26.2 Was the intensity of an Internal Standard in each sample within ~~60-125%~~ 30-120 of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	✓
Was the %RI for the two fold diluted sample within the acceptance limits (~~60-125%~~ 30-120)?	[___]	___	✓

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B190434

ICP - AES	
SAMPLE ID	VEECA-4SMI08-0211
ANALYTE	barium
Lab Value CONCENTRATION (mg/Kg)	30.1
AMOUNT FROM RAW DATA (ug/ml)	0.11804
SAMPLE SIZE (g)	0.982
FINAL VOLUME (ml)	50
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	30.051

ICP-MS	
SAMPLE ID	VEECA-6SMI05-0211
ANALYTE	arsenic
Lab Value CONCENTRATION (mg/Kg)	4.6
AMOUNT FROM RAW DATA (ug/L)	18.383916
SAMPLE SIZE (g)	0.996
FINAL VOLUME (L)	0.05
DILUTION FACTOR	5
DRYNESS FACTOR	1
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	4.61444

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags:**
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/17, 2/18
Received Date: 2/19, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/8 soils
Analysis Dates: 3/8 soils, 2/19 H2O

All holding time requirements were met.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a results of this difference. Curve processing and calculations were 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 LOD.
  - U at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair of sample VEECA-6SMI04-0211 exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No qualifications were required

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. One positive result above the LOQ was reported for the target analyte. All other results were non-detect. Clarification of the calculations was requested and received from the laboratory. No qualifications to the data were required.

Reviewer JACleveland **Date:** 5/4/11

Hexavalent Chromium Calcs - ICAL soils - 3/8/11

X - Response	Y - Concentration (mg/L)
0	0
0.006	0.005
0.011	0.01
0.02	0.025
0.039	0.05
0.079	0.1

slope, m (A1) =	1.293599598
y-int. (A0) =	-0.001751323
r =	0.99910848
Rr2=	0.998217755

VEECA-6SMI05-0211 Lab Value - 0.056 mg/Kg

Response = 0.01

Given: Amt = A_0 + Rsp * A_1

On-column

Amt = 0.011184673 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg = mg/Kg

Sample Mass (g)	7.98
Sample FV (L)	0.04
Conversion Factor	1000

Concentration = 0.056063524 mg/Kg

DataQual

Environmental Services, LLC

CH2M HILL-VBO
15010 Conference Center Drive
Suite 200
Chantilly, VA 20151

May 12, 2011
SDG# G1B230594, Test America- West Sacramento
Vieques Island, Puerto Rico

Dear Ms. Ott,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG # G1B230594. 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 (8330A SOP HW-16, Rev 2, Sept 2006); the Region II Standard Operating Procedures for the Evaluation of Metals Data (SOP HW-2 Revision 13, Sept. 2006) as it applies; the RI SAP ECA, January 2011 and professional judgment. The SOP for the inorganic parameters (metals- SW 846 methods 6010B and 6020) is used but is modified as necessary to reflect the QC requirements of the method and the site SAP. Region II has not developed a validation checklist SOP for the method used to assess hexavalent chromium (SW-846 method 7196A) or perchlorate (SW846 method 6850). 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	Explosives	Perchlorate	Metals 6010B	Metals 6020	Cr(VI)
VEECA-4SB01-001H-0211	G1B230594-001	soil	X	X	X	X	X
VEECA-4SB01-001H-0211 MS	G1B230594-001 MS	soil	X		X	X	
VEECA-4SB01-001H-0211 MSD	G1B230594-001 MSD	soil	X		X	X	

The samples were evaluated based on the following criteria:

- Data Completeness *
- Sample Condition *
- Technical Holding Times *
- HPLC Performance *
- ICP MS Tuning *
- Initial/Continuing Calibrations
- ICSA/ICSAB Standards *
- LLQ Standards *
- Blanks *
- Internal Standards *
- Surrogate Recoveries *

5830 Amberway Drive • St. Louis, MO 63128 • 314-330-1327 • Fax 314-849-6264

- Laboratory Control Samples *
- Matrix Spike Recoveries
- Matrix Duplicate RPDs *
- Serial Dilutions *
- Field Duplicates NA
- Field Triplicates NA
- Identification/Quantitation *
- Reporting Limits *
- Tentatively Identified Compounds NA

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

Overall Evaluation of Data/Potential Usability Issues

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

Explosives

No qualifications to the data were required.

Perchlorate

No qualifications to the data were required.

Metals

The associated ICV standard exhibited a high recovery for sodium. The reported positive result for sodium in the field sample was qualified as estimated J.

One result required qualification due to rinse blank contamination.

The submitted MS/MSD pair exhibited recoveries that were non-compliant. Therefore, qualifications to the data were required.

Please note – the reported calcium result was flagged as RLA by the laboratory to indicate that the reporting limit was raised because of a necessary dilution. This qualifier was crossed out and no additional validation qualifier was necessary.

Hexavalent Chromium

No qualifications to the data were required.

Specific Evaluation of Data

Data Completeness

Resubmissions were required for this data package. Calculation clarification was requested and received for the explosives, ICP-MS metals and the hexavalent chromium fractions. Tabulated recoveries were requested and received for the LLQ standards for the metals fractions. Retention time windows were not provided for the explosives fraction. The laboratory was contacted and some information was provided. Information that was not submitted was calculated and verified by the validator.

Technical Holding Times

According to chain of custody records, sampling was performed on 2/18/11 and samples were received at the laboratory on 2/19/11. All sample preparation and analysis was performed within Region II and/or method holding time requirements.

Initial/Continuing Calibrations

Metals

The associated ICV analyzed 3/1/11 at 16:07 exhibited a recovery for sodium that was above the upper QC limit of 110% at 117.1%. Therefore the reported positive result for sodium was qualified as estimated J with a qualifier code of CCH.

Blanks

Metals

Associated blanks exhibited contamination as noted in the following table.

Blank ID	Analyte	Concentration	Action Level
VEECA-EB01-021811-DSS	selenium	7.0J ug/L/0.35 mg/Kg	LOD

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

Sample ID	Analyte	Q Flag
VEECA-4SB01-001H-0211	selenium	U at LOD

Matrix Spike Recoveries

Metals

The matrix spike pair submitted in this SDG exhibited non-compliant %R's for two analytes, requiring qualification in the field samples. A summary of these non-compliances and affected samples are noted in the following table. Please note that results were not qualified unless both recoveries were non-compliant. Also, criteria did not apply to several analytes due to the abundance of the target analyte in the native sample. Further, results were not rejected unless recoveries were both above 200%.

MS	Analytes	Samples	%R	Q Flag	Q Code
VEECA-4SB01-001H-0211	antimony	all soil samples	49/50	J/UJ	MSL
	vanadium		77/71		

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

Explosives

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Perchlorate

Sample ID	Compound	Results	Q flag	Q Code
No qualifications required				

Metals

Sample ID	Analyte	Results	Q flag	Q Code
VEECA-4SB01-001H-0211	sodium	•	J	CCB
VEECA-4SB01-001H-0211	selenium	+J	U at LOD	EBL
VEECA-4SB01-001H-0211	antimony vanadium	+/-	J/UJ	MSL

Hexavalent Chromium

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

CH2M Hill Inc

Client Sample ID: VEECA-4SB01-001H-0211

HPLC

Lot-Sample #...: G1B230594-001 Work Order #...: MEQ971A4 Matrix.....: SO
Date Sampled...: 02/18/11 08:30 Date Received..: 02/19/11
Prep Date.....: 03/01/11 Analysis Date..: 03/05/11
Prep Batch #...: 1060413 Analysis Time..: 11:31
Dilution Factor: 0.99

Method.....: SW846 8330B

PARAMETER	RESULT	LOQ	UNITS	DL
3,5-Dinitroaniline	30 U	250	ug/kg	8.7
1,3,5-Trinitrobenzene	30 U	250	ug/kg	9.9
1,3-Dinitrobenzene	30 U	250	ug/kg	4.2
2,4,6-Trinitrotoluene	30 U	250	ug/kg	19
2,4-Dinitrotoluene	30 U	250	ug/kg	5.2
2,6-Dinitrotoluene	30 U	250	ug/kg	7.2
2-Amino-4,6-dinitrotoluene	30 U	250	ug/kg	12
2-Nitrotoluene	30 U	250	ug/kg	13
3-Nitrotoluene	30 U	250	ug/kg	15
4-Amino-2,6-dinitrotoluene	30 U	250	ug/kg	9.9
4-Nitrotoluene	30 U	250	ug/kg	18
HMX	30 U	250	ug/kg	12
Nitrobenzene	30 U	250	ug/kg	17
Nitroglycerin	59 U	500	ug/kg	15
PETN	59 U	500	ug/kg	25
RDX	30 U	250	ug/kg	12
Tetryl	30 U	250	ug/kg	9.9

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
3,4-Dinitrotoluene	98	(81 - 127)

WW 051111

CH2M Hill Inc

Client Sample ID: VEECA-4SB01-001H-0211

HPLC

Lot-Sample #...:	G1B230594-001	Work Order #...:	MEQ971A5	Matrix.....:	SO
Date Sampled...:	02/18/11 08:30	Date Received..:	02/19/11		
Prep Date.....:	03/07/11	Analysis Date..:	03/09/11		
Prep Batch #...:	1066377	Analysis Time..:	18:46		
Dilution Factor:	0.99				
		Method.....:	SW846 6850_DOD Ha		

PARAMETER	RESULT	LOQ	UNITS	DL
Perchlorate	0.50 U	6.3	ug/kg	0.33

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

MM 04/2/11

016

CH2M Hill Inc

Total Metals Analysis Data Sheet

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	VEECA-4SB01-001H-0211
Lot Number:	G1B230594	**Lab WorkOrder:**	MEQ97
Matrix:	SOIL	**Lab Sample ID:**	G1B230594001
% Solids:	78.0	**Date/Time Collected:**	02/18/11 8:30
Units:	MG/KG	**Date/Time Received:**	02/19/11 9:00

CAS No.	Analyte	Concentration	C	Q	Method
7429-90-5	Aluminum	7700.0000			P
7440-36-0	Antimony	2.5000	~~U~~	UJ MSL	P
7440-38-2	Arsenic	5.9000			P
7440-39-3	Barium	15.5000			P
7440-41-7	Beryllium	0.1300	U		P
7440-43-9	Cadmium	0.1000	J		P
7440-70-2	Calcium	282000.00	~~RLA~~		P
7440-47-3	Chromium	22.5000			P
7440-48-4	Cobalt	5.9000			P
7440-50-8	Copper	12.1000			P
7439-89-6	Iron	11800.000			P
7439-92-1	Lead	3.2000	~~G~~U		P
7439-95-4	Magnesium	5430.0000			P
7439-96-5	Manganese	646.0000			P
7440-02-0	Nickel	6.0000			P
7440-09-7	Potassium	2000.0000	~~B~~		P
7782-49-2	Selenium	~~0.7300~~ 1.3	~~J~~	U EBL	P
7440-22-4	Silver	0.1200	J		P
7440-23-5	Sodium	3870.0000		J CCH	P
7440-28-0	Thallium	0.6400	U		P
7440-62-2	Vanadium	53.9000		J MSL	P
7440-66-6	Zinc	18.0000			P

value for Se is 1.3
JAC 5/11

U Result is less than the reporting limit. (RL)
B Method blank contamination. Analyte detected at a reportable level in blank.
G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
J Estimated result. Result is less than RL.
RLA The reporting limit for this analyte is elevated due to sample dilution.

Results and reporting limits have been adjusted for dry weight

JAC 4/26/11

Form 1 Analysis Data Sheet Equivalent

CH2M Hill Inc

Client Sample ID: VEECA-4SB01-001H-0211

General Chemistry

Lot-Sample #...: G1B230594-001 Work Order #...: MEQ97 Matrix.....: SO
Date Sampled...: 02/18/11 08:30 Date Received..: 02/19/11

PARAMETER	RESULT	LOQ	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
pH	10.3	0.13	--	SW846 9045C	03/01/11	1060380
	Dilution Factor: 1			Analysis Time..: 12:48	DL.....: 0.13	
Hexavalent Chromium	0.032 U	0.064	mg/kg	SW846 7196A	03/02/11	1063140
	Dilution Factor: 1			Analysis Time..: 14:49	DL.....: 0.013	
Percent Moisture	21.6	0.10	%	ASTM D 2216-90	03/01-03/02/11	1060372
	Dilution Factor: 1			Analysis Time..: 09:54	DL.....: 0.10	

NOTE(S):

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

JAC 4/26/11

012

Case Narrative

TestAmerica West Sacramento Project Number G1B230594

General Comments

The sample was received at 1 and temperature blank at 0 degree Celsius with wet ice used as a cooling agent.

Please note that the sample ID was changed at the request of Victoria Weber from VEECA-4SB01-TTBB-0211 to VEECA-4SB01-001H-0211. The corrections memo is include in this package with the chain of custody information.

Please note samples submitted on same date requiring incremental sampling method (ISM) have been reported in lab lot G1B190434.

Data has been reported in accordance with the DoD QSM v4.1 requirements. The U qualifier indicates the analyte was not detected and is reported as less than the LOD. The "U" appears next to all the results where the LOD has been substituted for "ND".

SOLID, 6850/DOD Handbook, Perchlorate
Sample: 1
In accordance with the requirements of method 6850, both a laboratory control sample (LCS) and a synthetic matrix check sample (SMCS) were analyzed with the associated samples. Both are reported on the LCS data evaluation and recovery reports, and are differentiated from one another by their work order number:
LCS: MFAE31AC
SMCS: MFAE31AD

SOLID, 6010B, Metals
Sample: 1
The recoveries for aluminum, antimony, calcium, iron, manganese and vanadium are outside the established control limits for the matrix spike/matrix spike duplicate (MS/MSD) associated with this batch. The concentrations of aluminum, calcium, iron and manganese in the parent sample are greater than 4 times the added spike concentration. Acceptable LCS data demonstrate that the analytical system is in control.

The method blank associated with this extraction batch has potassium detected below one half the reporting limit. As the value detected in the method blank is so low, no corrective action is warranted.

Case Narrative

TestAmerica West Sacramento Project Number G1B230594

SOLID, 6020, Arsenic, Selenium, Thallium
Sample: 1
The noted sample required a 5x dilution due to high levels of cations which suppressed the internal standard and caused the closing calibration verification (CCV) to fail criteria. The reporting limits were raised accordingly.

There are no other anomalies associated with this project.

014

Sample Summary

TestAmerica West Sacramento Project Number G1B230594

WO#	Sample #	Client Sample ID	Sampling Date	Received Date
MEQ97	1	VEECA-4SB01-001H-0211	2/18/2011 08:30 AM	2/19/2011 09:00 AM

Notes:

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

~~GIB190434~~ 2/24/11 2
GIB230594

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Page 1 of 1

Client: CH2M HILL, PM: John Swenfurth Contact: Victoria Weber	Contract: N62470-08-D-1000	Phone #: (757) 671-6208	Fax #: (773) 866-1378
Address: 5700 Cleveland St, Suite 101	City: Virginia Beach	State: VA	Zip Code: 23462
Project #: 408040.FI.FK.EC	Proj. Name/No.: ECA-RI		Airbill number: 8736 9330 8830
Bill (if different than above): CH2M HILL, Inc, A/P	Address: PO Box 241329, Denver, CO 80224		
Sampler (Print/Sign): Dia Whitaker		Copies To:	

LAB USE ONLY

Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

	FEDEX	UPS	CLIENT
Temp Blank		Intact	Not Intact

Analysis and Container Type

				2 of 16-oz glass			1 of 8-oz glass jar, OR 1 of 4-oz glass jar (if no EXPLO)			1 of 16 Oz glass jar	2 of 1L Amber	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	1 of 500ml HDPE	1 of 250ml HDPE	Container
				Soil MIS			8330 Metals + pH, "Metals Only" for battery disposal area			Grain size	8330 water	8850 water	total metal water	total HexCr water	total metal water	total HexCr SW	Diss metals	Diss HexCr	Test America Supplied Label
				4°C, headspace			4°C, headspace			None	4°C	field filter 0.2µm, headspace, 4°C no light	HNO3, 4°C	4°C	HNO3, 4°C	4°C	field filter 0.45µm, HNO3, 4°C	field filter 0.45µm, 4°C	Preservative
	Sample Description	Date/Time Collected	Matrix (aq, sd, ss, sb)	No. of Containers	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH) *not for replicates	EXPLO (8330B List & Perch)	METAL (ICP-AES, ICP-MS, HexCr)	WCHEM (pH)	WCHEM (TOC)	GRAINSIZE	EXPLO (8330B list)	EXPLO (Perch)	METAL (Solid List ICP-AES, ICP-MS)	METAL (HexCr)	METAL Liquid List (ICP-AES, ICP-MS)	METAL (HexCr)	FMETAL (Liquid List ICP-AES, ICP-MS)	FMETAL (HexCr)	Comments
4	~~VEECA-03MI05-0211~~	~~02-17-11 1435~~	~~SMI~~	~~4~~		~~4~~												See GIB190434		
5	~~VEECA-03MI06-0211~~	~~02-17-11 1240~~	~~SMI~~	~~4~~		~~4~~														
6	VEECA-4SB01-TT88-0211	02-18-11 0830	sb	1					1											

02/18/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time 02/18/11 1300	Received By: FEDEX	Relinquished By:	Date/Time		Received By:
Relinquished By:	Date/Time 2-19-11 915	Received By:	Relinquished By:	Date/Time		Received By:

cooler 1

Ulabs

Interio (916) 373 - 5600

Corrections to COCs

TO: Karen Sellers

COPIES: File
EDD
Data Package

FROM: Victoria Weber
Environmental Information Specialist
CH2M HILL

DATE: March 4, 2011

This memo is to document corrections made to the Chains of Custody (COC) and laboratory log-ins for Vieques ECA CTO – 037.

The following analyses need to be added for the samples listed:

~~G1B120440~~
G1C040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-5SD01-000H-0211	TOC – Lloyd Kohn	2/10/2011	09:30
VEECA-5SD02-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:00
VEECA-5SD03-000H-0211	TOC – Lloyd Kohn	2/10/2011	11:05
VEECA-5SD04-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:45
VEECA-5SD05-000H-0211	TOC – Lloyd Kohn	2/9/2011	13:20
VEECA-5SD06-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:05
VEECA-5SD07-000H-0211	TOC – Lloyd Kohn	2/10/2011	14:25
VEECA-5SD08-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:00
VEECA-5SD09-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:20
VEECA-5SD10-000H-0211	TOC – Lloyd Kohn	2/10/2011	10:25
VEECA-5SD11-000H-0211	TOC – Lloyd Kohn	2/10/2011	9:55
VEECA-5SD12-000H-0211	TOC – Lloyd Kohn	2/10/2011	12:00
VEECA-5SD13-000H-0211	TOC – Lloyd Kohn	2/10/2011	16:00
VEECA-5SD14-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:25
VEECA-5SD15-000H-0211	TOC – Lloyd Kohn	2/10/2011	15:35

The following samples need updated sample IDs, dates, and/or times:

G1B100573-5
G1B120440+C040608

[illegible]	[illegible]	[illegible]	[illegible]
VEECA-EB01-020911-SW	2/9/2011	07:00	MEAFV
VEECA-5SD01-000H-0211	2/10/11	09:30	MEDMQ
VEECA-5SD02-000H-0211	2/10/11	09:00	MEDMR
VEECA-5SD02P-000H-0211	2/10/11	09:00	MEDNM

17

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

GIB120440 + FIC040608	VEECA-5SD03-000H-0211	2/10/11	11:05	MEDMT	
	VEECA-5SD04-000H-0211	2/10/11	10:45	MEDMV	
	VEECA-5SD05-000H-0211	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-MS	2/10/11	13:20	MEDMW	
	VEECA-5SD05-000H-0211-SD	2/10/11	13:20	MEDMW	
	VEECA-5SD06-000H-0211	2/10/11	14:05 OK	MEDMX	
	VEECA-5SD07-000H-0211	2/10/11	14:25 (10:15)	MEDM0	
	VEECA-5SD08-000H-0211	2/10/11	15:00 (10:30)	MEDM1	
	VEECA-5SD09-000H-0211	2/10/11	12:20 (12:30)	MEDM2	
	VEECA-5SD10-000H-0211	2/10/11	10:25 (11:30)	MEDM3	
	VEECA-5SD11-000H-0211	2/10/11	09:55	MEDM4	
	VEECA-5SD11P-000H-0211	2/10/11	09:55	MEDNJ	216
	VEECA-5SD12-000H-0211	2/10/11	12:00	MEDM5	
	VEECA-5SD13-000H-0211	2/10/11	16:00	MEDNF	
	VEECA-5SD14-000H-0211	2/10/11	15:25	MEDNG	
	VEECA-5SD15-000H-0211	2/10/11	15:35	MEDNH	
IB100573 - 2	VEECA-5SW02-0211	2/9/11	10:10	MEAFQ	✓
- 6	VEECA-5SW04-0211	2/9/11	11:35	MEAFW	✓
	VEECA-5SW04-0211-MS	2/9/11	11:35	MEAFW	✓
- 5	VEECA-EB01-020911-SW	2/9/11	07:00	MEAFV	✓
IB190434 - 4	VEECA-6SMI05-0211	2/17/11	15:00	MEMJR	✓
GIB230594 - 1	VEECA-4SB01-001H-0211 *	2/18/11	08:30	MEQ97	✓
IB040475 - 2	VEECA-4SMI02-0211 ✓	2/2/11 ✓	11:00 ✓	MD3CL	✓

* from VEECA-4SB01-TTBB-0211

COPYRIGHT 2011 BY CH2M HILL, INC. • COMPANY CONFIDENTIAL

U18

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

LOT RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT CH2MHILL PM KS LOG # 64480

LOT# (QUANTIMS ID) G1B230594 QUOTE# 88113 LOCATION W21C

Checked (✓)

DATE RECEIVED 2-19-11 TIME RECEIVED 980 ☑

DELIVERED BY ☑ FEDEX ☐ ON TRAC ☐ OTHER

☐ GOLDENSTATE ☐ UPS ☐ EZ PARCEL

☐ TAL COURIER ☐ TAL SF ☐ CLIENT ☑

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) _____

COC #(S) _____ ☑

TEMPERATURE BLANK Observed: _____ Corrected: _____

SAMPLE TEMPERATURE - (TEMPERATURES ARE IN °C)

Observed: _____ Average _____ Corrected Average _____

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER _____ ☑

See temp sheet

Initials: CA Date: 2-19-11

==========

pH MEASURED ☐ YES ☐ ANOMALY ☑ N/A ☑

LABELED BY..... ☑

LABELS CHECKED BY..... ☑

PEER REVIEW _____ ☑ NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING ☑

WETCHEM ☑ N/A ☑

VOA-ENCORES ☑ N/A ☑

☐ METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL ☑ N/A ☑

☐ COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES ☑ N/A ☑

☑ CLOUSEAU ☑ TEMPERATURE EXCEEDED (2 °C – 6 °C)*1 ☐ N/A

☑ WET ICE ☐ BLUE ICE ☐ GEL PACK ☐ NO COOLING AGENTS USED ☑ PM NOTIFIED

Initials: CA Date: 2-23-11

Notes _____

*1 Acceptable temperature range for State of Wisconsin samples is ≤4°C.

U1S

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

MULTI COOLER RECEIPT CHECKLIST
TestAmerica West Sacramento

CLIENT: CH2M Hill LOT# (QUANTIMS ID): ~~G1B1K0434~~ G1B230594 2-23-11

Checked (✓)

COOLER ID 1 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600193, 600194 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 0 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER

COOLER ID 2 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600195, 600194 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 1 2 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

COOLER ID 3 ☑

CUSTODY SEAL STATUS ☑ INTACT ☐ BROKEN ☐ N/A ☑

CUSTODY SEAL #(S) 600200, 600199 ☑

COC #(S) NA

SHIPPPING CONTAINER(S) ☑ TAL ☐ CLIENT ☐ N/A ☑

TEMPERATURE BLANK: OBSERVED: 0 CORRECTED 0 ☑

SAMPLE TEMPERATURE:

OBSERVED: 1 1 1 AVERAGE: 1 CORRECTED 1 ☑

SAMPLES / TESTS (IF NCM REQUIRED): ☑

LABORATORY THERMOMETER ID:

IR UNIT: #4 ☑ #5 ☐ ☐ OTHER ☑

CK 2-19-11

Initials Date

U26

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Bottle Lot Inventory

Lot ID: G1B230594

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*																				
VOAh*																				
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
____AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
____CGJ																				
500CGJ																				
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
_____"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

h = hydrochloric acid s = sulfuric acid na = sodium hydroxide n = nitric acid zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

QA-185 5/05 EM

Page 3

U21

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# G1B230594

LAB: Test America - West Sacramento SITE: Vieques ECA RI

1.0 Introduction

1.1 The attached Standard Operating Procedure (SOP) is applicable to nitro substituted aromatic and nitro substituted amines by High Performance Liquid Chromatography (HPLC)data. Its scope is not only to facilitate the data validation process of the data reported by the contracting laboratory, but also to ensure the data is being reviewed in a uniform manner.

1.2 This SOP is based upon the quality control assurance requirements specified in analytical SW 846 Method 8330A Revision 1, January 1998, and the National Function Guidlines, January 2005.

2.0 Responsibilities

2.1 The reviewer must be knowledgeable of the analytical method and its criteria.

2.2 The reviewer must complete and/or file the following:

Data Assessment Checklist - The data reviewer evaluates Each criterion carefully and checks if data is in compliance, non-compliace or not applicable.

Data Assessment Narrative - The data reviewer must present professional judgement, address areas of concern and comment on the validity of the overall data package. The reviewer must explain the reasons for rejecting and or qualifing the data.

Telephone Record Log - All phone conservations must be transcribed by the reviewer. Upon completion of the data review,

YES NO N/A

the original telephone log is attached to the data assessment narrative.

YES NO N/A

3.0 Data Completeness and Deliverables

3.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

3.2 Have any missing deliverables been received and added to the data package? [ ] ___ ✓

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

4.0 Cover Letter, SDG Narrative

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

4.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

5.0 Data Validation Checklist

5.1 Does this data package contain:

Water data? [ ] ___ ___

Waste data? [ ] ___ ___

Soil/solid data? [✓] ___ ___

6.0 Traffic Reports and Laboratory Narrative

6.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

YES NO N/A

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

6.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? ___ [✓] ___

ACTION: If any sample analyzed as a soil, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample contains more than 90% water, non detects shall be qualified as unusable, "R."

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

7.0 Special QC

7.1 Prior to preparation of stock solutions; acetonitrile, methanol, and water should be analyzed to determine possible interferences with analyte peaks. A different batch of solvent should be used if contamination is present.

7.2 Chromatograms are to be submitted showing that there are no interferences with analyte peaks.

Are these chromatograms present in package? [ ] ___ ✓

Are the chromatograms free of interferences? [ ] ___ ✓

Action: Ask lab for resubmittals. If deliverables are unavailable, judge the effect of the validity of the data. If questionable, contact SMO and note in data assessment.

Sampled 2/18/11 Prep 3/1/11
Recd 2/19/11 Analy 3/5/11

8.0 Holding Times

8.1 Have any nitroaromatics and nitroamines technical

Temp 0°C

YES NO N/A

holding times, determined from date of collection to date of extraction, been exceeded? ___ 14 ___

Water and waste samples must be properly perseved (cooled to 4° +/- 2°), and nitro substituted aromatics and amines analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

Matrix	Preserved	Criteria	Action	
			Detected compounds	Non-detected compounds
Aqueous	No	≤ 7 days(extraction) ≤ 40 days(analysis)	Use professional judgement	
	No	> 7 days(extraction) > 14 days(analysis)	Use professional judgement	
	Yes	≤ 7 days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 7 days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly exceeded	J	UJ or R

YES NO N/A

Non-aqueous	No	≤ 14days(extraction) ≤ 40 days (analysis)	Use professional judgement	
	No	> 14days(extraction) >40 days(analysis)	Use professional judgement	
	Yes	≤ 14days(extraction) ≤ 40 days(analysis)	No qualification	
	Yes	> 14days(extraction) > 40 days(analysis)	J	UJ
	Yes/No	Grossly Exceeded	J	UJ or R

YES NO N/A

9.0 Surrogate Recovery (Form II)

9.1 The analyst most monitor the performance of the extraction and analytical system as well as the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and reagent water blank with one or two surrogates (e.g., analytes not expected to be present in the samle).

9.2 Were the recoveries of the surrogate spikes presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices? listed on Form 1

a. Water/Waste [ ] ___ ___

b. Soil/Solid [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables or information are unavailable, document the effect in the data assessment.

9.3 Are all the pesticide samples listed on the appropriate surrogate recovery form for each of the following matrices? on Form 1

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

YES NO N/A

9.4 The laboratory must evaluate the surrogate data from individual samples versus the surrogate control limits developed by the laboratory. Method 8000C, Sec 9.0 details evaluating surrogate data and updating surrogate limits. If laboratory established recovery limits are not established, use surrogate recovery between 70 - 130% for all samples, including MS, MSDs, LCSs, and all blanks. Are surrogate recovery limits met? [✓] ___ ___

ACTION: Circle all outliers in red. Follow surrogate action Table 2.

9.5 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? Windows not provided, just std dev and value [ ] ___ ✓

ACTION: Follow surrogate action, Table 2 below.

Table 2. Surrogate Recovery Criteria

Criteria	Action	
	Detected Target Compounds	Non-detected Target Compounds
%R > 200%	J	Use professional judgement
130% < %R ≤ 200%	J	No qualification
70% ≤ %R ≤ 130%	No qualification	
10% ≤ %R < 70%	J	UJ
%R < 10% (sample dilution not a factor)	J	R
%R < 10% (sample dilution is a factor)	Use professional judgement	
RT out of RT window	Use professional judgement	
RT within RT window	No qualification	

YES NO N/A

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

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

10.0 Laboratory Control Sample

10.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

10.2 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000C (section 9.5). [✓] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

10.3 Were the Laboratory Control Samples analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for. [✓] ___ ___

10.4 Were Laboratory Control Samples analyzed at the required concentration as specified in Method

YES NO N/A

8000C(sec 9.5)(near the middle of the calibration range) for all target analytes. [✓] ___ ___

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

10.5 Did laboratory calculate in-house performance criteria for LCS recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

10.6 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ___ ✓

10.7 If LCS recovery criteria were not met, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 3 recovery actions criteria.

Table 3. LCS Recovery Actions

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R > Upper Acceptance Limit	J	No qualification
%R < Lower Acceptance Limit	J	R
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

11.0 Matrix Spikes (Form III)

11.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix. [✓] ___ ___

YES NO N/A

NOTE: For soil and waste samples showing detectable amounts of organics, the lab may substitute replicate samples in place of the matrix spike spike.

11.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [✓] ___ ___

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

11.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level.

a. Water [ ] ___ ___

b. Waste [ ] ___ ___

c. Soil/Solid [✓] ___ ___

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

11.4 Were the Matrix Spike Samples spiked and analyzed for all the nitroaromatics and nitroamines analytes that the samples are analyzed for (Same analytes as LCS). [✓] ___ ___

ACTION: If no, did the lab use the optional QC acceptance criteria discussed in Method 8000C(section 9.7)?

List the criteria used and make note in data assessment.

Criteria used _____

11.5 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000C(sec (9.5)(Same concentration as LCS) for all target analytes. [✓] ___ ___

11.6 Did laboratory calculate in-house performance criteria for matrix spike recoveries according to Method 8000C section 9.7, and were recoveries met? [✓] ___ ___

11.7 If in house LCS recoveries performance criteria were not generated, the laboratory should use 70 - 130% criteria, and was this criteria met? [ ] ___ ✓

YES NO N/A

11.8 How many matrix spike recoveries are outside the in-house performance criteria or QC limits of 70 - 130%?

Water
___out of ___

0 Soil
out of 34

11.9 How many RPDs for the Matrix Spike and Matrix Spike Duplicate (if applicable)recoveries are greater than the QC limit of 20%?

Water
__out of__

0 Soil
out of 17

11.8 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 4. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the nitroaromatics and nitroamines fraction is out of specification (Table 4), use professional judgement to qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualification of detects of non-spiked compounds.

Table 4. MS/MSD Actions for Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Compounds
%R or RPD > Upper Acceptance Limit	J	No qualification
20% ≤ %R < Lower Acceptance Limit	J	UJ
%R < 20%	J	Use professional judgement
Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit	No qualifications	

YES NO N/A

12.0 Blanks (Form IV)

12.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? ✓ ___ ___

12.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? ✓ ___ ___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

12.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for nitroaromatics and nitramines? ✓ ___ ___

13.0 Contamination

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

13.1 Do any method/instrument/reagent/cleanup blanks have positive results for nitroaromatics or nitramines? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ ✓ ___

13.2 Do any field/rinse blanks have positive nitroaromatics or nitramines results? ___ ✓ ___

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

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

YES NO N/A

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 5. Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Clean up, Instrument, Field	Detects	Not detected	No qualification
	< CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	> CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL and < blank contamination	Report the concentration for the sample with a U, or quanity the data as unusable R
		≥ CRQL and ≥ blank contamination	Use professional judgement
	= CRQL	< CRQL	Report CRQL value with a U
		≥ CRQL	Use professional judgement
	Gross contamination	Detects	Qualify results as unusable R

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

13.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

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

VECA-EB01-021811-DSS MOE

YES NO N/A

14.0 HPLC Apparatus and Materials

14 .1 Was the proper HPLC chromatographic column used for the analysis of nitroaromatics or nitramines?

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8330A, section 4.1) [ ] ___ ___

14.2 Indicate the specific type of HPLC column.

column 1: Synergi-Hydro RP C18

column 2: Synergi Hydro RP C18

ACTION: Note any changes to the suggested materials in section 14.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

15.0 Calibration and HPLC Performance

15.1 Are the following liquid chromatograms and data systems printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. Calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

15.2 Are data summary forms (containing calibration factors or response factors) for the initial 5 pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [✓] ___ ___

NOTE: External standard calibration procedures are used (Method 8000C (section 11.4.2), therefore calibration factors must be used.

YES NO N/A

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

15.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ ✓ ___

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

15.4 Are standard retention time (RT) windows for each nitroaromatics and nitramines peak of interest presented on modified CLP summary forms? ___ ✓ ___

not provided, only std dev and value

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all nitroaromatics and nitramines are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000C section 11.6).

Best results are obtained using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

15.5 Were RT windows on the confirmation column established using three standards as described above? ✓ ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 15.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

15.6 Do all standard retention times in each level of the initial 5 pt. calibrations for nitroaromatics and nitramines fall within the windows established during the initial calibration sequence? ✓ ___ ___

YES NO N/A

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standards spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 80000C(section 11.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

15.7 Has the linearity criteria for the initial calibration standards been satisfied for both columns? (% RSD for the calibration factors (CFs)must be < 20.0% for all analytes). IY ___ ___

ACTION: If no, follow Table 6 criteria.

Table 6. Initial Calibration CF Action for Nitroaromatic and Nitramine Analysis

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associatedd Compounds
% RSD > 20%	J	UJ
% RSD within allowable limits	No qualifications	

15.8 Does the calibration verification/continuing calibration standard contain the nitroaromatics or nitramines peaks of interest, analyzed on each working day, prior to sample analyses? IY ___ ___

15.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence IY ___ ___

ACTION: If no, take action as specified in section 3.2 above.

15.10 Has the percent difference (%D) between the

036

YES NO N/A

Calibration Factor (CF) of the peaks used to identify the nitroaromatics and nitramines in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

15.11 Has a new 5 pt. initial calibration curve been generated for those nitroaromatics and nitramines analytes which failed in the calibration verification/continuing calibration standard (8000C, section 11.7.3), and all samples which followed the out-of-control calibration verification/standard continuing calibration standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (Table 7)

15.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000C, section 11.6), using RTs from the associated calibration verification/continuing standard? [ ] ✓ ___

See below

ACTION: If no, take action specified in section 3.2 above

15.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [ ] ✓ ___

15.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the daily RT windows. [ ] ___ ✓

ACTION: If the answer to either 15.12 or 15.13 above is no, check the chromatograms of all samples which followed the last in-control standard. All samples analyzed after the last in-control standard must be re-injected, if initial analysis indicated the presence of the specific analyte that exceeded the retention time criteria). If samples were not re-analyzed, document under Contract Non-compliance in the Data Assessment.

Reviewer has two options to determine how to qualify questionable sample data. First option is to determine if possible peaks are present within daily retention time window. If no possible peaks are found, non-detects are valid. If possible peaks are found (or interference), qualify positive hits as presumptively present "NJ" and non-detects are rejected "R". Second option is to use the ratio of the retention time of the analyte over the

Not provided w/ daily RTW data validator checked CCal in sequence and compared RT to check stability -OK

YES NO N/A

retention time of either surrogate. The passing criteria is ± 0.06 RRT units of the RRT of the standard component. Reject "R" all questionable analytes exceeding criteria, and "NJ" all other positive hits.

15.15 Has no more than 14 hours elapsed from the injection of the opening CCV and the end of the analytical sequence (closing CCV). (Table 7) ☑ ___ ___

Table 7. CCV Criteria

Criteria	Action	
	Detected Associated Compounds	Non-Detected Associated Compounds
RT out of RT window	Use professional judgement (Sec 15.14)	
%D not within +/- 15%	J	UJ
Time elapsed greater than section 15.15 criteria.	R	
%D, time elapsed, RT are all within acceptable limits.	No qualifications	

15.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ ☑ ___

ACTION: If large errors exists call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

16.0 Analytical Sequence Check (Form VIII-nitroaromatics and nitramines) Run log

16.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? ☑ ___ ___

ACTION: If no, take action specified in 3.2 above.

16.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? ☑ ___ ___

YES NO N/A

Note: Sequence is as follows: 5 point initial calibration, method blank, LCS, CCS, 10 sample extracts, CCV, 10 sample extract, and so on. The sequence must always end with a CCV. As long as the first CCV is within QC, the initial calibration does not have to be rerun.

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

16.3 Were the surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

w/in 1 min

Action: If no, see "Action" in section 15.14 above

17.0 Extraction Techniques for Sample Preparation

Method 8330A permits a variety of extraction techniques to be used for sample preparation. Which extraction procedure was used?

17.1 Aqueous samples:

1. Low Level (salting-out extraction)) [ ] ___ ___
2. High-level (Sample filtration) [ ] ___ ___
3. Solid phase extraction (Method 3535) [ ] ___ ___
4. Other [ ] ___ ___

17.2 Soil and sediment samples:

1. Sonication [ ] ___ ___
2. Other [✓] ___ ___

18.0 Nitroaromatics and Nitramines Identification

NO ⊕

18.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two HPLC columns, been completed for every sample in which a nitroaromatics or nitramines was detected? [ ] ___ ___ ✓

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

YES NO N/A

18.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries. ___ [ ] ✓

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

18.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [ ] ___ ✓

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second HPLC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

18.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently. Were there any false negatives? ___ [ ] ✓

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

18.5 Is the percent difference (%D) calculated for the positive sample results on the two HPLC columns <25.0%? [ ] ___ ✓

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

% Difference	Qualifier

YES NO N/A

0-25%		none
26-70%		"J"
71-100%		"NJ"
101-200%	(No Interference)	"R"
101-200%	(Interference detected)**	"NJ"
>50%	(Analyte value is <CRQL)	"U"
>200%		"R"

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

19.0 Compound Quantitation and Reported Detection Limits

19.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ ✓ ___

NOTE: Nitroaromatics and Nitramines peak results can be checked for rough agreement between quantitative results obtained on the two HPLC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 18.5 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

19.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? ✓ ___ ___

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

ACTION: When a sample is analyzed at more than one dilution, the lowest EDLs are used (unless a QC exceedance dictates the use of the higher EDL data from the diluted sample analysis). Replace concentrations that exceed the calibration range in the original analysis by crossing out the value on the original Form I and substituting it with

YES NO N/A

data from the analysis of diluted sample. Specify which Form I is to be used, then draw a red "X" across the entire page of all Form I's that should not be used, including any in the summary package.

ACTION: EDLs affected by large, off-scale peaks should be qualified as unusable, "R". If the interference is on-scale, the reviewer can provide a modified EDL flagged "UJ" for each affected compound.

14.0 Chromatogram Quality

14.1 Were baselines stable? [✓] ___ ___

14.2 Were any electropositive displacement (negative peaks) or unusual peaks seen? ___ [✓] ___

ACTION: Note all system performance problems in the data assessment.

15.0 Field Duplicates

15.1 Were any field duplicates submitted for Nitroaromatics and Nitramines. [ ] [✓] ___

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

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, the identity of the field duplicates is questionable. An attempt should be made to determine the proper identification of field duplicates.

Field Triplicate →
not submitted for this data pkg

DataQual Environmental Services, LLC

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 4:53 PM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: RE: Explosives for Vieques ECA RI
Attachments: Retention time window.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Laura,
Here is part of the information you requested. Attached are the retention time window studies for the explosives. We're still in the process of generating the other forms but will get those to you by the end of the day.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Friday, May 06, 2011 12:03 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Hillary.Ott@CH2M.com; Michael.Zamboni@CH2M.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I just wanted to follow-up with you concerning the explosives forms and see if you are still on schedule to have those to me today.

Thank you,

Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Wednesday, April 27, 2011 1:38 PM
To: DataQual Environmental Services, LLC
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,
I'm so sorry that I didn't more fully explore the requirements for the deliverables pertaining to the specific EPA Region that governs this project. I didn't realize that there were additional data/forms from our standard product and as such didn't alert the lab. You know that I'll be doing a little research in this regard so that this won't be a reoccurring theme for other projects.

U45

We can generate these forms but won't be able to have the forms for all the SDGs until next Friday, 5/6. Are there any SDGs or lab lots that are a higher priority?

Again, please accept my apology for this oversight.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Monday, April 25, 2011 9:28 AM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Karen,

Thank you for your response. I will wait to hear from you concerning the retention time windows. Concerning the Form X, Region II supplies a set of worksheets that I am required to use during the validation process. Within these worksheets there are different qualification flags that are applied based on the %D; therefore the result is not just qualified if the %D is over 40%. So these forms are needed so that I know exactly what the %D value is.

Thank you,
Laura

From: Sellers, Karen [mailto:Karen.Sellers@testamericainc.com]
Sent: Monday, April 25, 2011 10:39 AM
To: DataQual Environmental Services, LLC
Cc: Jacqueline Cleveland; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: RE: Explosives for Vieques ECA RI

Hi Laura,

1. We do not have a Form X equivalent (table of primary results, confirmation results and the % D between the columns) in this data package. We are not yet routinely providing this type of form. Lisa from our QA division checked the report for this lot, and found that the datasheet for this lot was appropriately flagged for the single positive result that had %D > 40%. Will these forms be needed for your validation?

2. Retention time windows – Lisa confirmed that these were not provided. The operations group wasn't aware that retention time windows were required in the deliverable. I'll need to get these for you and will request them today. I'll get back to you ASAP with a time frame for completion.

Please don't hesitate to contact me if you have any other questions or need anything further.

KAREN SELLERS
Project Manager

044

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

From: DataQual Environmental Services, LLC [mailto:dataqual@charter.net]
Sent: Thursday, April 21, 2011 1:10 PM
To: Sellers, Karen
Cc: 'Jacqueline Cleveland'; Michael.Zamboni@CH2M.com; Vickie.Weber@ch2m.com
Subject: Explosives for Vieques ECA RI

Hi Karen,

I am providing data validation services to CH2M HILL for the Vieques ECA RI project. I have a questions concerning the Explosives as I have just started to look at this fraction. I came across a package with a sample that exhibited a positive result and I could not find a table that tabulates the column quantitation percent differences. Also Region II validation requests retention time windows be provided. Can you provide this information? We look at data from many laboratories that use different software so it could be that you have provided this information and I am overlooking it. Please let me know if this is the case.

Thank you,
Laura

Laura Maschhoff
DataQual Environmental Services, LLC
dataqual@charter.net

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC10-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 389480-4 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/18/11	1/19/11	1/20/2011				
	Standard Time	17:21	14:45	5:05				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.16	16.16	16.13	0.017	0.052	0.15	*
2	HMX	5.23	5.24	5.23	0.006	0.018	0.15	*
3	RDX	7.39	7.41	7.40	0.009	0.026	0.15	*
4	Picric Acid	8.38	8.40	8.44	0.031	0.093	0.15	*
5	1,3,5-Trinitrobenzene	9.62	9.64	9.63	0.009	0.026	0.15	*
6	1,3-Dinitrobenzene	12.15	12.19	12.17	0.021	0.062	0.15	*
7	TETRYL	13.10	13.15	13.13	0.024	0.071	0.15	*
8	Nitrobenzene	13.71	13.75	13.73	0.019	0.056	0.15	*
9	2,4,6-Trinitrotoluene	15.14	15.18	15.16	0.022	0.066	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.61	15.68	15.66	0.038	0.115	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.57	16.65	16.63	0.040	0.120	0.15	*
12	2,6-Dinitrotoluene	18.01	18.08	18.05	0.036	0.107	0.15	*
13	2,4-Dinitrotoluene	18.72	18.78	18.76	0.033	0.098	0.15	*
14	2-Nitrotoluene	21.65	21.73	21.71	0.042	0.127	0.15	*
15	4-Nitrotoluene	23.33	23.42	23.38	0.044	0.131	0.15	*
16	3-Nitrotoluene	25.03	25.13	25.09	0.051	0.153	0.15	
17	Nitroglycerin	14.21	14.25	14.23	0.022	0.066	0.15	*
18	PETN	26.86	26.96	26.91	0.051	0.152	0.15	
19	3,5-Dinitroaniline	12.84	12.89	12.87	0.027	0.082	0.15	*
20								
21								
22								
23	For all lots analyzed on LC10.							
24								
25								
26								
27	mr 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC11-C18 **METHOD ID:** 8330

COLUMN PHASE: C18 **DIMENSIONS:** 250 x 4.6mm 4u

COLUMN SN: 365716-12 **MINIMUM RTW (minutes):** 0.15

		1	2	3				
	Standard Date	1/9/11	1/10/2011	1/11/2011				
	Standard Time	15:32	9:23	5:57				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	16.44	16.45	16.52	0.044	0.131	0.15	*
2	HMX	5.12	5.12	5.13	0.006	0.017	0.15	*
3	RDX	7.33	7.33	7.34	0.006	0.017	0.15	*
4	Picric Acid	8.49	8.53	8.55	0.031	0.092	0.15	*
5	1,3,5-Trinitrobenzene	9.53	9.53	9.55	0.012	0.035	0.15	*
6	1,3-Dinitrobenzene	12.16	12.16	12.19	0.017	0.052	0.15	*
7	TETRYL	13.29	13.30	13.35	0.032	0.096	0.15	*
8	Nitrobenzene	13.78	13.78	13.82	0.023	0.069	0.15	*
9	2,4,6-Trinitrotoluene	15.25	15.26	15.31	0.032	0.096	0.15	*
10	4-AM-2,6-Dinitrotoluene	15.94	15.95	16.01	0.038	0.114	0.15	*
11	2-AM-4,6-Dinitrotoluene	16.92	16.92	16.98	0.035	0.104	0.15	*
12	2,6-Dinitrotoluene	18.29	18.29	18.37	0.046	0.139	0.15	*
13	2,4-Dinitrotoluene	18.99	18.99	19.07	0.046	0.139	0.15	*
14	2-Nitrotoluene	22.08	22.08	22.16	0.046	0.139	0.15	*
15	4-Nitrotoluene	23.81	23.80	23.90	0.055	0.165	0.17	
16	3-Nitrotoluene	25.57	25.57	25.67	0.058	0.173	0.17	
17	Nitroglycerin	14.34	14.35	14.40	0.032	0.096	0.15	*
18	PETN	27.43	27.46	27.57	0.074	0.221	0.22	
19	3,5-Dinitroaniline	12.97	12.97	13.02	0.029	0.087	0.15	*
20								
21								
22								
23	For all lots analyzed on LC11.							
24								
25								
26								
27	MS 5/6/11							
28								
29								
30								
31								

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

West Sacramento Laboratory
Retention Time Window
Calculation Spreadsheet

INSTRUMENT ID: LC12-CN
COLUMN PHASE: Zorbax CN
COLUMN SN: USJT010289

METHOD ID: 8330
DIMENSIONS: 250 x 4.6mm 5u
MINIMUM RTW (minutes): 0.15

		1	2	3				
	Standard Date	12/18/10	12/19/2010	12/20/2010				
	Standard Time	16:23	14:20	12:17				
	ANALYTE	RETENTION TIME 1	RETENTION TIME 2	RETENTION TIME 3	STANDARD DEVIATION	± 3X STD Deviation	RTW	
1	3,4-Dinitrotoluene (surr)	39.90	39.91	39.84	0.038	0.114	0.15	*
2	HMX	43.50	43.53	43.46	0.035	0.105	0.15	*
3	RDX	33.86	33.87	33.78	0.049	0.148	0.15	*
4	1,3,5-Trinitrobenzene	29.98	29.94	29.84	0.072	0.216	0.22	
5	1,3-Dinitrobenzene	26.69	26.67	26.59	0.053	0.159	0.16	
6	TETRYL	47.42	47.41	47.36	0.032	0.096	0.15	*
7	Nitrobenzene	23.23	23.21	23.16	0.036	0.108	0.15	*
8	2,4,6-Trinitrotoluene	42.26	42.27	42.17	0.055	0.165	0.17	
9	4-AM-2,6-Dinitrotoluene	38.50	38.52	38.44	0.042	0.125	0.15	*
10	2-AM-4,6-Dinitrotoluene	38.02	38.04	37.95	0.047	0.142	0.15	*
11	2,6-Dinitrotoluene	35.94	35.93	35.82	0.067	0.200	0.20	
12	2,4-Dinitrotoluene	34.89	34.87	34.78	0.059	0.176	0.18	
13	2-Nitrotoluene	30.53	30.51	30.44	0.047	0.142	0.15	*
14	4-Nitrotoluene							
15	3-Nitrotoluene	31.17	31.14	31.08	0.046	0.137	0.15	*
16	Nitroglycerin	45.89	45.91	45.85	0.031	0.092	0.15	*
17	PETN	53.50	53.48	53.45	0.025	0.075	0.15	*
18	3,5-Dinitroaniline	33.14	33.14	33.04	0.058	0.173	0.17	
19								
20								
21								
22								
23	For all lots analyzed on LC12.							
24								
25								
26								
27								
28								
29								
30								
31								

mr 5/6/11

Note: The retention time window is the retention time +/- 0.15 minute, or 3X the standard deviation, whichever is greater. A * indicates that 3X the standard deviation is less than the minimum RTW (0.15 minute for HPLC and 0.05 minute for capillary GC) and that the minimum RTW was substituted in the 3X RTW column.

Prepared by: Robyn Noonan Date: 1/27/2011

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (Method 6850 with DOD Perchlorate handbook modifications) Region II validation guidelines were used as applicable, however, the Region has not developed an SOP for this method so these worksheets are used as an alternative.

Laboratory: Test America- West Sacramento

Holding Times

Sampling Date: 2/18/11
Received Date: 2/19/11
Prep Date: 3/7/11
Analysis Dates: 3/9/11
Cooler Temp: 0°C

All prep and analysis holding time requirements were met.

Calibrations

Mass assignments were verified. The submitted linear fit calibrations/verifications were within criteria.

Internal Standards

All criteria meet.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying the 5X or 10X criteria.
- Apply the same data validation guidelines to any associated field QC blanks and all associated samples.
- Qualification/Action codes:

Blank Result	Sample Result	Action for Samples
Detects	Not detected	No qualifications
< RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
> RL	< RL	Report RL value with a U
	≥ RL and < blank contamination	Report the concentration for the sample with a U, or qualify the data as unusable R
	≥ RL and ≥ blank Contamination	Use professional judgment
≥ RL	< RL	Report RL value with a U
	≥ RL	Use professional judgment
Gross contamination	Detects	Qualify results as unusable R

All method and/or grinding blanks exhibited no contamination-no qualifications required. Associated QC blanks were: VEECA-EB01-021811-DSS (no positive results exhibited).

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was not submitted for this data package.

Field Triplicate Sample

A field triplicate was not submitted for this data package.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data and calculations were verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Reviewer Laura Marcellino **Date:** 4,20,11

GIB230594

	YES	NO	N/A
A.I.1 **Contract Compliance Screening Report**			
Present?	[ ]	___	✓
ACTION: If no, contact RSCC/PO.			
A.I.2 **Record of Communication (from RSCC)**			
Present?	[ ]	___	✓
ACTION: If no, request from the RSCC.			
A.1.3 **Sampling Trip Report**			
Present and complete?	[ ]	___	✓
ACTION: If no, contact RSCC/PO.			
A.I.4 **Chain of Custody/Sample Traffic Report**			
Present?	✓	___	___
Legible?	✓	___	___
Signature of sample custodian present?	✓	___	___
ACTION: If no, contact RSCC/WAM/PO.			
A.I.5 **Cover Page**			
Present?	✓	___	___
Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee?	✓	___	___
Do the sample identification numbers on the Cover Page agree with sample Identification numbers on:			
(a) Traffic Report Sheet?	[ ]	___	✓

	YES	NO	N/A
(b) Form I's?	[✓]	___	___
Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

	YES	NO	N/A
Is the SDG Narrative present?	[✓]	___	___
Is Sample Log-In Sheet(Form DC-1) present and complete?	[___]	___	✓
Is Complete SDG Inventory Sheet(Form DC-2) present and complete?	[___]	___	✓

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

	YES	NO	N/A
Laboratory Name?	[✓]	___	___
Laboratory Code?	[___]	✓	___
RAS/Non-RAS Case No.?	[___]	✓	___
SDG No.?	[✓]	___	___

	YES	NO	N/A
Contract No.?	[ ]	✓	

ACTION:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

	YES	NO	N/A
(a) all analytes analyzed by ICP-AES?		✓	
(b) all analytes analyzed by ICP-MS?		✓	
(c) Mercury?			✓
(d) Cyanide?			✓

ACTION:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

A.1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

A.1.8.1 Digestion/Distillation Log

	YES	NO	N/A
Digestion Log for ICP-AES (Form XII)present?	✓		
Digestion Log for ICP-MS (Form XII) present?	✓		
Digestion Log for mercury (Form XII) present?			✓
Distillation Log for cyanide (Form XII) present?			✓

Are pH values for metals and

	YES	NO	N/A
cyanide reported for each aqueous sample?	[ ]		✓
Are percent solids calculations present for soils/sediments?	[✓]		
Are preparation dates present on the sample preparation logs/bench sheets?	[✓]		

Values - not validated

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

	YES	NO	N/A
ICP-AES?	[✓]		
ICP-MS?	[✓]		
Mercury?	[ ]		✓
Cyanide?	[ ]		✓

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

	YES	NO	N/A
Legible?	[✓]		
Properly labeled?	[✓]		

Are all field samples, QC samples and field QC samples present on:

	YES	NO	N/A
Digestion/Distillation log?	[✓]		
Instrument Printouts?	[✓]		

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

	YES	NO	N/A

A.1.9 **Technical Holding Times**: (Aqueous and soil samples)

(Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.)

A.1.9.1 Cyanide distillation(14 days)exceeded?		[ ]	✓
Mercury analysis(28 days) exceeded?		[ ]	✓
Other Metals analysis(180 days)exceeded?		[✓]	

ACTION:
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

NOTE:
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

A.1.9.2 Is pH of aqueous samples for:

Metals Analysis ≤ 2?	[ ]		✓
Cyanide Analysis ≥ 12?	[ ]		✓

ACTION:
If no for any of the above, flag non-detects as "R" and detects as "J".

A.1.9.3 Is the cooler temperature ≤ 10 C°?	[✓]		

ACTION:
If cooler temperature is >10°C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

	YES	NO	N/A
present and complete?	[✓]	___	___

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

	YES	NO	N/A
Is the calculation error less than 10% of the correct result?	[✓]	___	___
Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)?	[✓]	___	___
Are results on Form I'S reported by correct significant figures?	[✓]	___	___
Are soil sample results on Form I's corrected for percent solids?	[✓]	___	___
Are all "less than MDL" values reported by the CRQLs and coded with "U"?	[✓]	___	___
Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"?	[✓]	___	___
Are appropriate contractual quality control and Method qualifiers used?	[✓]	___	___

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

CH2M HILL VIEQUES CTO-37 ECA METALS CALCULATIONS

SDG G1B230594

3/1, 1832

ICP - AES	
SAMPLE ID	VEECA-4SB01-001H-0211
ANALYTE	COBALT
Lab Value CONCENTRATION (mg/Kg)	5.9
AMOUNT FROM RAW DATA (ug/ml)	0.045451
SAMPLE SIZE (g)	0.98
FINAL VOLUME (ml)	100
DILUTION FACTOR	1
DRYNESS FACTOR	0.784
CONVERSION FACTOR (ug/g TO mg/Kg)	1
CALCULATED CONCENTRATION (mg/Kg)	5.916

3/6, 1039

ICP-MS	
SAMPLE ID	VEECA-4SB01-001H-0211
ANALYTE	selenium
Lab Value CONCENTRATION (mg/Kg)	0.73
AMOUNT FROM RAW DATA (ug/L)	1.184323
SAMPLE SIZE (g)	1.03
FINAL VOLUME (L)	0.1
DILUTION FACTOR	5
DRYNESS FACTOR	0.784
CONVERSION FACTOR (ug/g to mg/Kg)	1
CALCULATED CONCENTRATION (ug/Kg)	0.73331

	YES	NO	N/A
of the samples before and after digestion given on the Form I's?	[___]	✓	
Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I?	[___]	✓	

ACTION:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

Dilutions were performed as needed but this was not noted on Form I equivalents

A.1.11 **Initial Calibration**

	YES	NO	N/A
A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis?	✓		
Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis?	✓		
Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis?	[___]		✓
Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide?	[___]		✓

ACTION:
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

	YES	NO	N/A
Is one initial calibration standard at the CRQL level for cyanide and mercury?	[___]		✓

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

		YES	NO	N/A
	Mercury Analysis?	[___]	___	✓
	Cyanide Analysis?	[___]	___	✓
	ICP-AES(more than 2 point Calib.)?	[✓]	___	___
	ICP-MS (more than 2 point calib.)?	[✓]	___	___

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 **Initial and Continuing Calibration Verification- Form IIA**

		YES	NO	N/A
A.1.12.1	Present and complete for every metal and cyanide?	[✓]	___	___
	Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte?	[___]	___	✓

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

		YES	NO	N/A
A.1.12.2	Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent?	[✓]	___	___

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

		YES	NO	N/A
A.1.12.3	Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples?	[___]	___	✓

	YES	NO	N/A

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

Metals - 90-110%R?	[___]	✓	___
Hg - 80-120%R?	[___]	___	✓
Cyanide - 85-115%R?	[___]	___	✓

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

See following page for flags as necessary

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

CH2M Hill Inc

Initial and Continuing Calibration Verification

		03/01/11 16:07 ICV4 Found %REC	03/01/11 16:09 ICV2A Found %REC
Magnesium	0		4.78 0.0
	10000	9783.8 97.8	
Manganese	0		
	1000	1026.6 102.7	
Nickel	0		
	1000	1025.1 102.5	
Potassium	0		98.00 0.0
	10000	9984.5 99.8	
Silver	0		
	250	241.62 96.6	
Sodium	10000	11713 117.1	
	25000		25513 102.1
Vanadium	0		
	1000	973.61 97.4	
Zinc	0		1.47 0.0
	1000	993.06 99.3	

J+ result for Na

	YES	NO	N/A
(CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.)	[✓]	___	___
For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis?	[✓]	___	___
For each mercury run, was a CRQL standard analyzed?	[___]	___	✓
For each cyanide run, was a CRQL standard analyzed?	[___]	___	✓

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the ~~final~~ CCV/CCB and once every ~~20 analytical~~ samples in the analytical run for each analysis? [✓] ___ ___

frequency per lab SOP/method

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

Jacqueline Cleveland

From: Sellers, Karen [Karen.Sellers@testamericainc.com]
Sent: Friday, May 06, 2011 2:19 PM
To: Jacqueline Cleveland
Cc: Michael.Zamboni@CH2M.com
Subject: TestAmerica Additional Raw Data - LLQS for Vieques project
Attachments: G1B160524_LLQS.pdf; G1B040475_LLQS.pdf; G1B230594_LLQS.pdf; G1B190434_LLQS.pdf; G1B180604_LLQS.pdf

Good afternoon Jackie,
Attached are the LLQS data for 5 of the projects. I'll send the others in following e-mails. Please note that the 6010 data is from instrument Thermo and PO5 and the 6020 data is from M01 & M02. The file name and time will on these forms will help you associate them back to the run logs. Please let me know if you have any questions.

I'll follow up with the production group on the status of the other forms you're awaiting – Explosives Form X equivalent and retention time windows forms.

KAREN SELLERS
Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

880 Riverside Parkway
West Sacramento, CA 95605
Tel 916.374.4442 I Fax 916.372.1059
www.testamericainc.com

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: *Project Feedback*

CONFIDENTIALITY NOTICE: This e-mail communication, including any attachments, may contain privileged or confidential information for specific individuals and is protected by law. If you are not the intended recipient(s), you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited and you should delete this message and its attachments from your computer without retaining any copies. If you have received this communication in error, please reply to the sender immediately. We appreciate your cooperation.

Please consider the environment before printing this e-mail.

UTRN

Jacqueline Cleveland

From: Jacqueline Cleveland [cleve137@charter.net]
Sent: Monday, April 25, 2011 3:34 PM
To: 'Sellers, Karen'
Cc: 'DataQual Environmental Services, LLC'; 'Michael.Zamboni@CH2M.com'; 'Vickie.Weber@ch2m.com'
Subject: CH2M HILL ECA Metals

Importance: High

Good Afternoon Karen,

I have another resubmission request for the ECA data. I believe that this request likely applies to all of the SDGs submitted. For both the ICP-MS method 6020 and the ICP-AES method 6010 there is a requirement for a Low Level Quantitation Sample (LLQS) that must be run as part of your calibration verification criteria. This standard has QC criteria that applies of +/- 30%. This standard and criteria is a required part of the Region II data validation process. I am not seeing this standard in either the 6010 or the 6020 data packages. It looks like you are analyzing a LL standard but they are not included in the data package. Please submit results for these standards for all of the SDGs submitted. Please include a summary that tabulates %recoveries for these standards. If you have any questions don't hesitate to contact me. Thank you!

Jackie

Jacqueline Cleveland
Vice-President
DataQual, ES, LLC
636-352-9391
cleve137@charter.net

	YES	NO	N/A
Is the CRQL standard within control limits for:			
Metals(ICP-AES/ICP-MS)- 70 - 130%? un assoc Atdo	[✓]	___	___
Mercury- 70 - 130%?	[___]	___	✓
Cyanide - 70 - 130%?	[___]	___	✓

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 50%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

Resubs required - received 5/6

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when **Sample raw data are within** the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

A.1.14 **Initial and Continuing Calibration Blanks - Form III**

A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses?	[✓]	___	___
Was an initial Calibration Blank analyzed after ICV?	[✓]	___	___
Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent?	[✓]	___	___

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

	YES	NO	N/A
using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data)	[ ]		✓

ACTION:
If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative".

A.1.14.2 Circle with red pencil on each Form III all Calib. Blank values that are:

≥ MDL but ≤ CRQL

> CRQL

	YES	NO	N/A
A.1 14.2.1 When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL?		[✓]	

ACTION:
If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects.

	YES	NO	N/A
A.1.14.2.2 When MDL < CRQL, is any Calib. Blank value > CRQL?		[✓]	

ACTION:
If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U".

	YES	NO	N/A
A.1.14.2.3 Is any Calibration Blank value below the negative CRQL?		[✓]	

ACTION:
If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL.

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

	YES	NO	N/A

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

	YES	NO	N/A
Each Sample Delivery Group (SDG)?	[✓]	___	___
Each batch of the SDG samples digested/distilled?	[___]	___	___
Each matrix type?	[___]	___	___
All instruments used for metals and cyanide analyses?	[___]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

no quals required

CH2M Hill Inc

Total Metals Preparation Blank Results

Lab Name:	TESTAMERICA WEST SACRAMENT	**Client Sample ID:**	BLK - G1C010000238B
Lot Number:	G1B230594	**Lab WorkOrder:**	ME11T
Matrix:	SOIL	**Lab Sample ID:**	G1C010000238B
Instrument Id:	T01	**Analysis Date/Time:**	3/1/2011 6:11:00PM
Units:	MG/KG		

Analyte	Concentration	C	Method
Aluminum	10.0000	U	P
Antimony	2.0000	U	P
Barium	0.5000	U	P
Beryllium	0.1000	U	P
Cadmium	0.1000	U	P
Calcium	25.0000	U	P
Chromium	0.5000	U	P
Cobalt	0.5000	U	P
Copper	0.5000	U	P
Iron	5.0000	U	P
Lead	0.5000	U	P
Magnesium	10.0000	U	P
Manganese	0.5000	U	P
Nickel	0.5000	U	P
Potassium	16.6000	J	P
Silver	0.2000	U	P
Sodium	25.0000	U	P
Vanadium	0.5000	U	P
Zinc	1.0000	U	P

No Quals req'd – result in sample >> LOD

Result is less than the reporting limit. (RL)
Estimated Result. Result is less than RL.

	YES	NO	N/A
but ≤ CRQL to CRQL with a "U".			
A.1.15.2.2 When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL?	___	[✓]	___
If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples?	___	[✓]	___
If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value?	___	[___]	✓

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

	YES	NO	N/A
A.1.15.2.3 Is the Prep. Blank concentration below the negative CRQL?	___	[✓]	___

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

	YES	NO	N/A
A.1.15.2.4 When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value.			
A.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
A.1.16.1	Present and complete?	[✓]	___	___
	Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples? at beginning only	[✓]	✓	___
	Was ICS analyzed at the beginning of the ICP-MS analytical run?	[✓]	___	___
	ACTION: If no, flag as estimated (J) all sample results.			
A.1.16.2	**ICP-AES Method**			
A.1.16.2.1	**ICSA Solution:** For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value?	[✓]	___	___
	If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV?	[___]	___	✓
	ACTION: If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run: Flag (J) as estimated only sample results ≥MDL			

	YES	NO	N/A
for which the ICSA "Found' value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J".			
A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value?	[✓]	___	___
If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV?	[___]	___	✓

ACTION:
If yes, apply the followirg action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 **ICP-MS Method**

A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

CH2M Hill Inc

Interference Check Standard AB

Instrument Id: M02

Lot Number: G1B230594

Datafile Name: 110306A2

Units: ug/L

Analyte	Spike Amount	ICSAB 03/06/11 09:45		ICSAB 03/06/11 09:58	
		Found	%REC	Found	%REC
Arsenic	100	32.32	32.3	104.74	104.7
Selenium	100	33.44	33.4	111.73	111.7
Thallium	50	14.82	29.6	46.87	93.7

↓ NQ - ICSAB rerun & was OK

		YES	NO	N/A
A.1.16.3.3	**ICSAB Solution** For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater?	[✓]	___	___

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 **Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A**
Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

		YES	NO	N/A
A.1.17.1	Was Matrix Spike analysis performed:			
	For each matrix type?	[✓]	___	___
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[✓]	___	___
	For each concentration range (i.e., low, med., high)?	[✓]	___	___
	For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used?	[✓]	___	___
	Was a spiked sample prepared and analyzed with the SDG samples?	[✓]	___	___

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

		YES	NO	N/A
A.1.17.2	Was a field blank or PE sample used for the spiked sample analysis?	___	[✓]	___

ACTION:
If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis.

A.1.17.3	Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations.			
	Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations?	[___]	✓	___
	NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added.			
	Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA?	[✓]	___	___

See pages following for flagging specifics

ACTION:
If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative.

A.1.17.4 **Aqueous**

Are any spike recoveries:

(a) less than 30%?	___	[___]	✓
(b) between 30-74%?	___	[___]	___
(c) between 126-150%?	___	[___]	___
(d) greater than 150%?	___	[___]	___

ACTION:
If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects

074

CH2M Hill Inc

Total Metals Spike Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SB01-001H-0211
Lot Number:	G1B230594	**MS Lab Workorder:**	MEO97 - MS
Matrix:	SOIL	**MS Lab Sample ID:**	G1B230594001S
% Solids	78.0	**QC Batch ID:**	1060238
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MS Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	13400.0000	N	7700.0000		248.0000	2300.0	N	P	*
Antimony	80 - 120	30.3000	N	2.5000		61.9000	49.0	N	P	J/UJ
Barium	80 - 120	239.0000		15.5000		248.0000	90.0		P	
Beryllium	80 - 120	5.4300		0.1300		6.1900	88.0		P	
Cadmium	80 - 120	5.2700		0.1000	J	6.1900	84.0		P	
Calcium	80 - 120	248000.0000	N	282000.0000	RLA	6190.0000	0.0	N	P	*
Chromium	80 - 120	51.1000		22.5000		24.8000	116.0		P	
Cobalt	80 - 120	57.5000		5.9000		61.9000	83.0		P	
Copper	80 - 120	41.2000		12.1000		30.9000	94.0		P	
Iron	80 - 120	12800.0000	N	11800.0000		124.0000	842.0	N	P	*
Lead	80 - 120	56.3000		3.2000	G	61.9000	91.0		P	
Magnesium	80 - 120	12000.0000		5430.0000		6190.0000	107.0		P	
Manganese	80 - 120	495.0000	N	646.0000		61.9000	0.0	N	P	*
Nickel	80 - 120	58.1000		6.0000		61.9000	84.0		P	
Potassium	80 - 120	8460.0000		2000.0000	B	6190.0000	104.0		P	
Silver	75 - 120	6.2000		0.1200	J	6.1900	98.0		P	
Sodium	80 - 120	10300.0000		3870.0000		6190.0000	103.0		P	
Vanadium	80 - 120	102.0000	N	53.9000		61.9000	77.0	N	P	J/UJ
Zinc	80 - 120	71.8000		18.0000		61.9000	87.0		P	

N Spike sample recovery is outside control limits.

* out due to abundance - NQ

075

CH2M Hill Inc

Total Metals Spike Duplicate Sample Recovery

Lab Name:	TestAmerica Sacramento	**Client Sample ID:**	VEECA-4SB01-001H-0211
Lot Number:	G1B230594	**MS Lab Workorder:**	MEO97 - MSD
Matrix:	SOIL	**MS Lab Sample ID:**	G1B230594001D
% Solids	78.0	**QC Batch ID:**	1060238
Units:	MG/KG	**Instrument ID:**	T01

Analyte	Control Limits	MSD Result	C	Sample Result	C	Spike Added	% REC	Q	M	
Aluminum	80 - 120	12500.0000	N	7700.0000		250.0000	1920.0	N	P	*
Antimony	80 - 120	31.5000	N	2.5000		62.5000	50.0	N	P	J/W
Barium	80 - 120	240.0000		15.5000		250.0000	90.0		P	
Beryllium	80 - 120	5.4300		0.1300		6.2500	87.0		P	
Cadmium	80 - 120	5.3700		0.1000	J	6.2500	84.0		P	
Calcium	80 - 120	266000.0000	N	282000.0000	RLA	6250.0000	0.0	N	P	*
Chromium	80 - 120	48.7000		22.5000		25.0000	105.0		P	
Cobalt	80 - 120	57.7000		5.9000		62.5000	83.0		P	
Copper	80 - 120	40.7000		12.1000		31.2000	91.0		P	
Iron	80 - 120	12000.0000	N	11800.0000		125.0000	188.0	N	P	*
Lead	80 - 120	55.5000		3.2000	G	62.5000	89.0		P	
Magnesium	80 - 120	11500.0000		5430.0000		6250.0000	96.0		P	
Manganese	80 - 120	450.0000	N	646.0000		62.5000	0.0	N	P	*
Nickel	80 - 120	58.6000		6.0000		62.5000	84.0		P	
Potassium	80 - 120	8380.0000		2000.0000	B	6250.0000	102.0		P	
Silver	75 - 120	6.2900		0.1200	J	6.2500	99.0		P	
Sodium	80 - 120	9920.0000		3870.0000		6250.0000	97.0		P	
Vanadium	80 - 120	98.2000	N	53.9000		62.5000	71.0	N	P	J/W
Zinc	80 - 120	70.9000		18.0000		62.5000	85.0		P	

N Spike sample recovery is outside control limits.

Out due to abundance - NQ

076

	YES	NO	N/A
as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL.			
(**NOTE**:Replace "N" with "J", "R" as appropriate.)			
A.1.17.5 **Soil/Sediment**			
Are any spike recoveries:			
(a) less than 10%?	___	[✓]	___
(b) between 10-74%?	✓	[___]	___
(c) between 126-200%?	___	[✓]	___
(d) greater than 200%?	✓	[___]	___
ACTION: If yes for any of the above, proceed as follows:			
If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (**NOTE**:Replace "N" with "J" or "R" as appropriate.)			
A.1.18 **Lab Duplicates] - Form VI**			
A.1.18.1 Was the lab duplicate analysis performed:			
For each SDG?	[✓]	___	___
On one of the SDG samples?	[___]	___	___
For each matrix type?	[___]	___	___
For each concentration range (low or med.)?	[___]	___	___
For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used?	[___]	___	___
Was a lab duplicate prepared and analyzed with the SDG samples?	[✓]	___	___

MS/MSD
RPDs

077

		YES	NO	N/A
	ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed.			
	NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis.			
A.1.18.2	Was a Field Blank or PE sample used for the Lab Duplicate analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis.			
A.1.18.3	Circle on each Form VI all values that are:			
	RPD > 20%, or			
	Absolute Difference > CRQL			
	Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)?	[✓]	___	___
	If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.			
	NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects.			
A.1.18.4	**Aqueous**			
A.1.18.4.1	When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			

	YES	NO	N/A
is any RPD > 20% but < 100%?	___	[___]	✓
is any RPD ≥ 100%?	___	[___]	✓

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(**NOTE**:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

	YES	NO	N/A
> ± CRQL?	___	[___]	✓
> ± 2xCRQL?	___	[___]	✓

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 **Soil/Sediment**

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

	YES	NO	N/A
is any RPD ≥ 35% but < 120%?	___	[✓]	___
is any RPD ≥ 120%?	___	[✓]	___

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

		YES	NO	N/A
	data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL.			
A.1.18.5.2	When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate:			
	> ± 2 x CRQL?	___	[✓]	___
	> ± 4 x CRQL	___	[✓]	___

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 **Field Duplicates**

Aqueous Field Duplicates

A.1.19.1	Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

	YES	NO	N/A
QC criteria stated in Sections A.1.19.2 and A.1.19.3.			

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

is any RPD ≥ 20%?	___	[___]	___
is any RPD ≥ 100%?	___	[___]	___

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

> ± CRQL?	___	[___]	___
> ± 2 x CRQL?	___	[___]	___

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

		YES	NO	N/A
	and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate.			
	Soil/Sediment Field Duplicates			
A.1.19.4	Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report)	[___]	___	✓

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form 1's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

		YES	NO	N/A
A.1.19.5	Circle on each Appendix A.4 all values that have: RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),			
	is any RPD ≥ 35% but < 120%?	___	[___]	✓
	is any RPD ≥ 120%?	___	[___]	✓

ACTION:
If the RPD is ≥ 35% but < 120%,

		YES	NO	N/A
	flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL.			
A.1.19.6	When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate:			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL?	___	[___]	✓

ACTION:
If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate.

A.1.20 **Laboratory Control Sample (LCS) - Form VII**

A.1.20.1	Was one LCS prepared and analyzed for:			
	Each SDG?	[✓]	___	✓
	Each matrix type?	[✓]	___	___
	Each batch samples digested/distilled?	[✓]	___	___
	For each Method(ICP-AES,ICP-MS,Hg,CN) used?	[✓]	___	___
	Was an LCS prepared and analyzed with the samples?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed.

NOTE:
If only one LCS was analyzed for

	YES	NO	N/A

more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J).

A.1.20.2 **Aqueous LCS**

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

Less than 50%?	___	[___]	✓
Between 50% and 79%?	___	[___]	___
Between 121% and 150%?	___	[___]	___
Greater than 150%?	___	[___]	___

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 **Solid LCS**

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII?	___	[✓]	___

ACTION:

		YES	NO	N/A
	If yes, flag (J) all the associated detects ≥ MDL as estimated (J).			
	Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII?	___	[✓]	___
	ACTION: If yes, flag detects as "J" and non-dectes as "UJ".			
A.1.21	**ICP-AES/ICP-MS Serial Dilution - Form VIII** NOTE: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL.			
A.1.21.1	Was a Serial Dilution analysis performed:			
	For each SDG?	[✓]	___	___
	On one of the SDG samples?	[ ]	___	___
	For each matrix type?	[ ]	___	___
	For each concentration range (low or med.)?	[ ]	___	___
	Was a Serial Dilution sample analyzed with the SDG samples?	[✓]	___	___
	ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed.			
A.1.21.2	Was a Field Blank or PE sample used for the Serial Dilution Analysis?	___	[✓]	___
	ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples			
A.1.21.3	Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10%			

		YES	NO	N/A
	when initial concentrations ≥ 50 x MDLs.			
	Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's?	[___]	___	✓
	ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative.			
A.1.21.4	Are any %D values:			
	> 10%?	___	[✓]	___
	≥ 100%?	___	[✓]	___
	ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose **raw data** ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with **raw data** ≥ MDL.			
	(**NOTE**:Replace "E" with "J" or "R" as appropriate.)			
A.1.22	**Total/Dissolved or Inorganic/Total Analytes**			
A.1.22.1	Were any analyses performed for dissolved as well as total analytes on the same sample(s)?	___	[___]	✓
	Were any analyses performed for inorganic as well as total analytes on the same sample(s)?	___	[___]	✓
	ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic) and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL.			
A.1.22.2	Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%?	___	[___]	✓

		YES	NO	N/A
A.1.22.3	Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%?	___	[___]	✓

ACTION:
If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values.

A.1.23 **Field Blank - Form I**
NOTE: **Designate "Field Blank" as such on Form I**

A.1.23.1	Was a Field/Rinsate Bank collected and analyzed with the SDG samples?	[✓]	___	___
	If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)?	✓ ___	[___]	___
	If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL).	assoc. RB analyzed in SDG GIB190434		
	Is any Field Blank value greater than CRQL also greater than the Preparation Blank value?	___	[✓]	___
	If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria?	[___]	___	✓

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result > MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

	YES	NO	N/A

Prep.Blank value, do not qualify the sample results due to the Field Blank criteria.

Se 7. JB / 0.35 mg/kg adjusted sample LOD is 1mg/kg. U@ LOD in 45301-001H

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 **Verification of Instrumental Parameters - Form IX, XA, XB, XI**

A.1.24.1 Is verification report present for:

	YES	NO	N/A
Method Detection Limits (Form IX-Annually)?	[✓]	___	___
ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)?	[✓]	___	___
ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)?	[✓]	___	___

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 **Method Detection Limits - Form IX**

A.1.24.2.1 Are MDLs present on Form IX for:

	YES	NO	N/A
All the analytes?	[✓]	___	___
All the instruments used?	[✓]	___	___
Digested and undigested samples and Calib.Blanks?	[✓]	___	___
ICP-AES and ICP-MS when both instruments are used for the same analyte?	[✓]	___	___

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

		YES	NO	N/A
A.1.24.2.2	Is MDL greater than the CRQL for any analyte?	___	[✓]	___
	If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL?	[___]	___	✓
	ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL.			
A.1.24.3	**Linear Ranges - Form XI**			
A.1.24.3.1	Was any sample result higher than the high linear range for ICP-AES or ICP-MS?	___	[✓]	___
	Was any sample result higher than the highest calibration standard for mercury or cyanide?	___	[___]	✓
	If yes for any of the above, was the sample diluted to obtain the result reported on Form I?	[✓]	___	___
	ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I.			
A.1.25	**ICP-MS Tune Analysis - Form XIV**			
A.1.25.1	Was the ICP-MS instrument tuned prior to calibration?	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
A.1.25.2	Was the tuning solution analyzed or scanned at least five times consecutively?	[✓]	___	___
	Were all the required isotopes spanning the analytical range present in the tuning solution?	[✓]	___	___
	Was the mass resolution within			

dilutions were performed as necessary

		YES	NO	N/A
	0.1 amu for each isotope in the tuning solution?	[✓]	___	___
	Was %RSD less than 5% for each isotope of each analyte in the tuning solution?	[✓]	___	___
	ACTION: If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".			
A.1.26	**ICP-MS Internal Standards - Form XV**			
A.1.26.1	Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)?	[✓]	___	___
	Were all the target analyte masses bracketed by the masses of the five internal standards?	[✓]	___	___
	ACTION: If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.			
A.1.26.2	Was the intensity of an Internal Standard in each sample within 60-125% of the intensity of the same Internal Standard in the calibration blank?	[✓]	___	___
	If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed?	[___]	___	✓
	Was the %RI for the two fold diluted sample within the acceptance limits (60-125%)?	[✓]	___	___
	ACTION: If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter			

dilutions were necessary due to interferences

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 **Percent Solids of Sediments**

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [✓] ___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

Inorganic Data Review Narrative

Case# _____ **Site:** _____ **Matrix: Soil** ____

SDG# _____ **Lab:** _____ **Water** ____

Sampling Team: _____ **Reviewer:** _____ **Other** _____

A.2.1 **Data Validation Flags:**
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as **estimated**

R and Red-Line - A red-line drawn through a sample result indicates **unusable** value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully **usable**.

A.2.2 **Laboratory Qualifiers:**
The CLP laboratory applies a contractual qualifier on all

This SDG contains hexavalent chromium analysis by method 7196A. Validation performed using Region II modifications and flagging conventions with site and/or method specific QC limits.

HOLDING TIMES

Sampling Date: 2/18
Received Date: 2/19, Cooler temps were low, receipt documentation present. No qualifications required
Prep. Dates: 3/2 soils
Analysis Dates: 3/2 soils

All holding time requirements were met.

CALIBRATIONS

The correct initial calibration procedures were followed. All initial calibration criteria were met. Calibration verification criteria were met. Raw data was verified. The LR curve equation and processed curve was not the same as the way it was presented in the SOP. Clarification was requested and it was confirmed that the calibration processing procedures were changed and that the SOP had not been updated to reflect what was being done in the lab. There were no qualifications required as a result of this difference. Curve processing and calculations were 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 at LOD - The associated blank result was between the MDL and the LOD. The reported result was flagged as non-detect at the LOD.

Blank ID	Analyte	Concentration	Action Level
no contamination noted			

See validation report for specific samples and qualifications. Only those analytes requiring action are listed here.

Sample ID	Analyte	Q Flag	Q Code

MATRIX SPIKE/DUPLICATE SUMMARY

The MS/MSD pair associated with this SDG (from SDG G1B170553) exhibited acceptable recoveries and RPD. No qualifications were required. The LCSs were acceptable.

FIELD DUPLICATE SAMPLE SUMMARY

Note: Field duplicate results are assessed based on Region II guidance for metals analytes.
Sample ID: NONE Duplicate Sample ID:

Analyte	Sample Conc.	Duplicate Conc.	RPD
hexavalent chromium			#DIV/0!

Comments: No field duplicate pairs were submitted.

SAMPLE RESULT VERIFICATION

Specific Comments:

All sample results were reported within the calibration/linear range of the instruments. Detection limits were acceptable. Raw data was verified. Non-detect results were correctly reported to the analyte LOD. No positive results were reported in the sample in this SDG. Clarification of the calculations was requested from the laboratory.

Received 5/3/11

Reviewer JACleveland **Date:** 4/26/11

Hexavalent Chromium Calcs - ICAL solis - 3/2/11

X - Response	Y - Concentration (mg/L)
0	0
0.005	0.005
0.008	0.01
0.019	0.025
0.041	0.05
0.083	0.1

slope, m (A1) =	1.206688155
y-int. (A0) =	0.000292775
r =	0.999635559
Rr2=	0.999271251

VEECA-4SB01-001H-0211 Lab Value - 0.032 U mg/Kg
Response = 0.001

Given: Amt = A_0 + Rsp * A_1
On-column
Amt = 0.001499463 mg/L

Given: Concentration = on-column amt.(mg/L) * Final Volume (L) * (1/ Initial weight (g)) * 1000 g/Kg * DF * (1/% Solids Factor) = mg/Kg

Sample Mass (g)	7.97
Sample FV (L)	0.04
Conversion Factor	1000
Dilution Factor	1
% Solids Factor	0.784
Concentration =	0.009598898 mg/Kg

Appendix F
Surface Investigation Derived Waste Disposal Information

Vieques-East
CTO-37, ECA
IDW Raw Analytical Results
February 2011

Sample ID	VEECA-WW01-022211
Sample Date	2/22/11 11:00
Chemical Name	
TCLP Volatile Organic Compounds (UG/L)	
1,1-Dichloroethene	45 U
1,2-Dichloroethane	45 U
2-Butanone	450 U
Benzene	45 U
Carbon tetrachloride	45 U
Chlorobenzene	45 U
Chloroform	34 J
Tetrachloroethene	45 U
Trichloroethene	45 U
Vinyl chloride	45 U
TCLP Semivolatile Organic Compounds (UG/L)	
1,4-Dichlorobenzene	50 U
2,4,5-Trichlorophenol	50 U
2,4,6-Trichlorophenol	50 U
2,4-Dinitrotoluene	50 U
2-Methylphenol	50 U
3- and 4-Methylphenol	150 U
Hexachlorobenzene	50 U
Hexachlorobutadiene	50 U
Hexachloroethane	50 U
Nitrobenzene	50 U
Pentachlorophenol	250 U
Pyridine	100 U
TCLP Pesticides/Polychlorinated Biphenyls (UG/L)	
4,4'-DDD	0.5 U
4,4'-DDE	0.5 U
4,4'-DDT	0.5 U
Aldrin	0.25 U
alpha-BHC	0.25 U
alpha-Chlordane	0.25 U
beta-BHC	0.25 U
delta-BHC	0.25 U
Dieldrin	0.5 U
Endosulfan I	0.25 U
Endosulfan II	0.5 U
Endosulfan sulfate	0.5 U
Endrin	0.5 U
Endrin aldehyde	0.5 U
Endrin ketone	0.5 U
gamma-BHC (Lindane)	0.25 U
gamma-Chlordane	0.25 U
Heptachlor	0.25 U
Heptachlor epoxide	0.25 U
Methoxychlor	2.5 U
Toxaphene	10 U
TCLP Herbicides (UG/L)	
2,4,5-TP (Silvex)	2 U
2,4-D	2 U
TCLP Metals (MG/L)	
Arsenic	0.1 U
Barium	0.57
Cadmium	0.01 U
Chromium	0.1 U
Lead	0.1 U
Mercury	0.002 U
Selenium	0.1 U
Silver	0.01 U
Reactivity (MG/L)	
Reactive Cyanide	16 U
Reactive Sulfide	16 U
Corrosivity (PH)	
Corrosivity (pH Units)	8.41 J
Ignitability (DEG F)	
Flash point	212 U

\\tampa\Proj\USNAVFACENGCOM\408040CTO037\ECA_RI_REPORT_2011\Appendix F Investigation Derived Waste Disposal Information\[1000-CTO-0037 Vieques ECA IDW RE Tables.xlsx], Hillary Ott, 04/29/2011

Notes:

J - Estimated

U - Nondetect

DEG F - Degrees Fahrenheit

MG/L - Milligrams per liter

PH - pH units

UG/L - Micrograms per liter

Client: TestAmerica Laboratories, Inc.

Job Number: 580-24641-1
Sdg Number:

Client Sample ID: **VEECA-WW01-022211**

Lab Sample ID: 580-24641-1
Client Matrix: Water

Date Sampled: 02/22/2011 1100
Date Received: 02/24/2011 0905

8260B Volatile Organic Compounds (GC/MS)-TCLP

Method:	8260B	Analysis Batch: 580-81855		Instrument ID:	TAC001
Preparation:	5030B			Lab File ID:	G3013893.D
Dilution:	100	Leachate Batch: 580-81609		Initial Weight/Volume:	10 mL
Date Analyzed:	03/08/2011 1455			Final Weight/Volume:	10 mL
Date Prepared:	03/08/2011 1455				
Date Leached:	03/03/2011 1555				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride	ND		15	100
1,1-Dichloroethene	ND		15	100
2-Butanone	ND		150	1000
Chloroform	34	J	15	100
Carbon tetrachloride	ND		15	100
Benzene	ND		15	100
1,2-Dichloroethane	ND		15	100
Trichloroethene	ND		15	100
Tetrachloroethene	ND		15	100
Chlorobenzene	ND		15	100

Surrogate	%Rec	Qualifier	Acceptance Limits
Fluorobenzene (Surr)	96		80 - 120
Toluene-d8 (Surr)	95		85 - 120
Ethylbenzene-d10	104		80 - 120
4-Bromofluorobenzene (Surr)	94		75 - 120
Trifluorotoluene (Surr)	109		80 - 120

CH2M Hill Inc

Client Sample ID: VEECA-WW01-022211

GC/MS Semivolatiles

Lot-Sample #...: G1B230488-001 **Work Order #...:** MEQG11AA **Matrix.....:** WATER
Date Sampled...: 02/22/11 11:00 **Date Received..:** 02/23/11
Prep Date.....: 03/03/11 **Analysis Date..:** 03/08/11
Prep Batch #...: 1062183 **Analysis Time..:** 15:52
Dilution Factor: 1

Method.....: SW846 8270C

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,4-Dichlorobenzene	ND	50	ug/L	7.0
2,4-Dinitrotoluene	ND	50	ug/L	10
Hexachlorobenzene	ND	50	ug/L	7.0
Hexachlorobutadiene	ND	50	ug/L	6.5
Hexachloroethane	ND	50	ug/L	7.0
2-Methylphenol	ND	50	ug/L	4.7
3-Methylphenol & 4-Methylphenol	ND	150	ug/L	50
Nitrobenzene	ND	50	ug/L	8.0
Pentachlorophenol	ND	250	ug/L	10
Pyridine	ND	100	ug/L	4.0
2,4,5-Trichloro-phenol	ND	50	ug/L	10
2,4,6-Trichloro-phenol	ND	50	ug/L	10

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
2-Fluorobiphenyl	75	(49 - 98)
2-Fluorophenol	37	(24 - 68)
Nitrobenzene-d5	64	(53 - 102)
Phenol-d5	31	(10 - 50)
Terphenyl-d14	90	(76 - 121)
2,4,6-Tribromophenol	75	(28 - 132)

CH2M Hill Inc

Client Sample ID: VEECA-WW01-022211

GC Semivolatiles

Lot-Sample #...: G1B230488-001 **Work Order #...:** MEQG11AE **Matrix.....:** WATER
Date Sampled...: 02/22/11 11:00 **Date Received..:** 02/23/11
Prep Date.....: 03/03/11 **Analysis Date..:** 03/08/11
Prep Batch #...: 1062180 **Analysis Time..:** 14:32
Dilution Factor: 1

Method.....: SW846 8081A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
alpha-BHC	ND	0.25	ug/L	0.030
gamma-BHC (Lindane)	ND	0.25	ug/L	0.025
Heptachlor	ND	0.25	ug/L	0.016
Aldrin	ND	0.25	ug/L	0.011
beta-BHC	ND	0.25	ug/L	0.024
delta-BHC	ND	0.25	ug/L	0.015
Heptachlor epoxide	ND	0.25	ug/L	0.011
Endosulfan I	ND	0.25	ug/L	0.022
gamma-Chlordane	ND	0.25	ug/L	0.014
alpha-Chlordane	ND	0.25	ug/L	0.014
4,4'-DDE	ND	0.50	ug/L	0.031
Dieldrin	ND	0.50	ug/L	0.026
Endrin	ND	0.50	ug/L	0.027
4,4'-DDD	ND	0.50	ug/L	0.020
Endosulfan II	ND	0.50	ug/L	0.060
4,4'-DDT	ND	0.50	ug/L	0.026
Endrin aldehyde	ND	0.50	ug/L	0.021
Methoxychlor	ND	2.5	ug/L	0.014
Endosulfan sulfate	ND	0.50	ug/L	0.021
Endrin ketone	ND	0.50	ug/L	0.010
Toxaphene	ND	10	ug/L	2.6

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Decachlorobiphenyl	4.8 *	(38 - 138)
Tetrachloro-m-xylene	72	(64 - 107)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Client: TestAmerica Laboratories, Inc.

Job Number: 580-24641-1
Sdg Number:

Client Sample ID: **VEECA-WW01-022211**

Lab Sample ID: 580-24641-1
Client Matrix: Water

Date Sampled: 02/22/2011 1100
Date Received: 02/24/2011 0905

8151A Herbicides (GC/MS)-TCLP

Method:	8151A	Analysis Batch: 580-81711		Instrument ID:	TAC055
Preparation:	8151A	Prep Batch: 580-81700		Lab File ID:	580-24641-F-1-C3-5-
Dilution:	1.0	Leachate Batch: 580-81582		Initial Weight/Volume:	100 mL
Date Analyzed:	03/05/2011 0114			Final Weight/Volume:	10 mL
Date Prepared:	03/04/2011 1406			Injection Volume:	1 uL
Date Leached:	03/03/2011 1344				

Analyte	Result (ug/L)	Qualifier	MDL	RL
2,4-D	ND		0.80	2.5
Silvex (2,4,5-TP)	ND		0.80	2.5

Surrogate	%Rec	Qualifier	Acceptance Limits
2,4-Dichlorophenylacetic acid	77		40 - 135

CH2M Hill Inc

Client Sample ID: VEECA-WW01-022211

TCLP Metals

Lot-Sample #...: G1B230488-001 **Matrix.....:** WATER
Date Sampled...: 02/22/11 11:00 **Date Received..:** 02/23/11

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1060244						
Silver	ND	0.010	mg/L	SW846 6010B	03/01/11	MEQG11AP
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.0042	
Arsenic	ND	0.10	mg/L	SW846 6010B	03/01/11	MEQG11AH
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.060	
Barium	**0.57**	**0.10**	**mg/L**	**SW846 6010B**	**03/01/11**	**MEQG11AJ**
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.012	
Cadmium	ND	0.010	mg/L	SW846 6010B	03/01/11	MEQG11AK
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.0025	
Chromium	ND	0.10	mg/L	SW846 6010B	03/01/11	MEQG11AL
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.0060	
Lead	ND	0.10	mg/L	SW846 6010B	03/01/11	MEQG11AM
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.012	
Selenium	ND	0.10	mg/L	SW846 6010B	03/01/11	MEQG11AN
		Dilution Factor: 1		Analysis Time..: 17:59	MDL.....: 0.065	
Prep Batch #...: 1061298						
Mercury	ND	0.0020	mg/L	SW846 7470A	03/02-03/03/11	MEQG11AG
		Dilution Factor: 1		Analysis Time..: 12:49	MDL.....: 0.000068	

General Chemistry

Client Sample ID: VEECA-WW01-022211

Lab Sample ID: 580-24641-1
Client Matrix: Water

Date Sampled: 02/22/2011 1100
Date Received: 02/24/2011 0905

Analyte	Result	Qual	Units	Dil	Method
Flashpoint	>212		Degrees F	1.0	1020A
Analysis Batch: 580-82248	Date Analyzed: 03/14/2011 1516				
pH	8.41	HF	SU	1.0	9040B
Analysis Batch: 580-81698	Date Analyzed: 03/04/2011 1330				

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Cyanide, Reactive	ND		mg/L	16	16	1.0	9014
Analysis Batch: 580-81824	Date Analyzed: 03/08/2011 0835						
Prep Batch: 580-81805	Date Prepared: 03/08/2011 0513						
Sulfide, Reactive	ND		mg/L	16	16	1.0	9034
Analysis Batch: 580-81830	Date Analyzed: 03/08/2011 0916						
Prep Batch: 580-81806	Date Prepared: 03/08/2011 0515						

FedEx Express International Air Waybill

For FedEx services worldwide.

Sender's Copy

1 From *Please print and press hard.*

Date 02/22/11 Sender's FedEx Account Number

Sender's Name DIA WHITAKER Phone (813) 352-6614

Company CH2M HILL

Address CAMP GARCIA

Address BUILDING 4525

City VIEQUES State Province Puerto Rico

Country USA ZIP Postal Code 00765

2 To Recipient's Name KAREN SELLERS Phone (916) 374-4442

Company Test America - West Sacramento

Address 880 RIVERSIDE PARKWAY Dept./Floor

Address

City West Sacramento State Province CA

Country USA ZIP Postal Code 95605

Recipient's Tax ID Number for Customs Purposes
e.g., GST/RFC/VAT/IN/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 50 ☒ lbs. ☐ kg DIM / / ☐ in. ☐ cm

Commodity Description (DETAIL REQUIRED)	Harmonized Code	Country of Manufacture	Value for Customs (REQUIRED)
ENVIRONMENTAL SAMPLES		USA	500.00
COMPLETE IN ENGLISH			

Has EEI/SED been filed in AES? (For U.S. Export Only: Check One)
☐ No EEI/SED required, value $2,500 or less per Sch. B Number, no license required (NLR), not subject to ITAR.
☐ No EEI/SED required, enter exemption number:
☐ Yes — Enter AES proof of filing citation:
If other than NLR, enter License Exception:

Total Declared Value for Carriage 500.00

Total Value for Customs (Specify Currency) 500.00

4 Express Package Service *Packages up to 150 lbs. / 68 kg*
For packages over 150 lbs. (68 kg), use the FedEx Expanded Service Intl. Air Waybill.

☒ FedEx Intl. Priority ☐ FedEx Intl. First (Available to select locations. Higher rates apply.) ☐ FedEx Intl. Economy (FedEx Envelope and FedEx Pak rate not available.)

Not all services and options are available to all destinations. Dangerous goods cannot be shipped using this Air Waybill.

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*

6 Special Handling
☐ HOLD at FedEx Location ☐ SATURDAY Delivery (Available to select locations for FedEx Intl. Priority only.)

7a Payment *Bill transportation charges to:*
Enter FedEx Acct. No. or Credit Card No. below.
☐ Sender (Acct. No. in Section 1 will be billed.) ☐ Recipient ☒ Third Party ☐ Credit Card ☐ Cash/Check/Cheque
FedEx Acct. No. 186718208 FedEx Use Only
Credit Card No.
Credit Card Exp. Date

7b Payment *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. 186718208

8 Your Internal Billing Reference First 24 characters will appear on invoice.
408040.FI.FK-EC

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.

521

PART 158410-Rev. Date 4/09
©1994–2008 FedEx
PRINTED IN U.S.A.

FedEx Tracking Number 8716 9323 2606 Form ID No. 0402

Ship and track packages at fedex.com

The terms and conditions of service may vary from country to country. Consult our local office for specific information.
Non-Negotiable International Air Waybill • ©1994–2008 FedEx

Questions? Go to our Web site at fedex.com.
Or in the U.S., call 1.800.247.4747. Outside the U.S., call your local FedEx office.

RETAIN THIS COPY FOR YOUR RECORDS.

RRDA 12/09

Test America

Test America West Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916) 374 4442
POC Karen Sellers

Chain of Custody

Client: CH2M HILL, PM: John Swenfurth
Contact: Victoria Weber
Contract: N62470-08-D-1000
Phone #: (757) 671-6208
Fax #: (773) 695-1378

Address: 5700 Cleveland St, Suite 101
City: Virginia Beach
Zip Code: 23462

Project #: 408040.FI.FK.EC
Proj. Name/No.: ECA-RI
Airbill number: 8716 9323 2606

Bill (if different than above): CH2M HILL Inc, A/P
Address: PO Box 241329, Denver, CO 80224

Sampler (Print/Sign): Dia Whitaker
Copies To:

LAB USE ONLY
Work Order #:
Test America Project Number

Remarks:

Shipping Info:
Airbill No:
Temp C

FEDEX	UPS	CLIENT
Temp Blank	Intact	Not Intact

Analysis and Container Type
Preservatives

	Sample Description	Date/Time Collected	Matrix (sw, sd, ss, sb)	No. of Containers	VOCs via SW-846 8260	SVOCs via SW-846 8270	PESTs via SW-846 8081	HERBs via SW-846 8158	METALs via SW-846 6010/7470	Comments
					3 of 40ml VOA vials	5 of 1 L Amber, one of which can be a 500 ml poly instead				Container
					VOA Full TCLP leaching via below method	SVOCs, PESTs, HERBs, and METALs full TCLP leaching via below methods.				Test America Supplied Label
					4°C, HCL	4°C				Preservative
	VEECA-WW01-022211	02/22/11 1100	aq	8	3	2	1	1	1	Full TCLP and RCI

02/22/11

COMMENTS: 28-Day Turn Around Time, non-hazard,

Relinquished By:	Date/Time	Received By:		Date/Time		Received By:
	02/22/11 1200	FEDEX				
Relinquished By:	Date/Time	Received By:		Date/Time		Received By:

NON - HAZARDOUS WASTE TRANSPORTATION/ACCEPTANCE DOCUMENT

DATE 5-12-2011

TO:
PEÑUELAS VALLEY LANDFILL
Carr. 385 KM 4.5 Barrio Tallaboa
Peñuelas, Puerto Rico 00624
1-787-836-3535

FACILITY PERMIT NO. IDF-57-0020

FROM:
NAVAL FACILITIES ENGINEERING
ATLANTIC FLEET WEAPONS TRAINING AREA
VIEQUES, PR. 00765

P.O. NO.

No. of Units & Container Type	DESCRIPTION AND CLASSIFICATION OF WASTE MATERIAL	Waste Profile Sheet Code	TOTAL QUANTITY (Weight, Volume, Gallons, etc.)	WEIGHT (Subject to Correction)	RATE	CHARGES (For Carrier Use Only)
7	C/Y BASS. NON HAZ-Soil w/PCB	03386 PR				
1	DM NON HAZ Soil w/R2 & P2	03386 PR				
2	DM NON HAZ Soil	03386 PR				
1	DM DECON WATER	03445 PR				

GENERATOR'S CERTIFICATION: This is to certify that the above named materials are properly classified, described, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation, U.S. EPA and the Commonwealth of P.R. The waste described above were consigned to the Transporter named. The Treatment, Storage or Disposal Facility can and will accept the shipment of waste, and has a valid permit to do so. I certify that the foregoing is true and correct to the best of my knowledge.

GENERATOR'S SIGNATURE	TITLE	DATE SHIPPED	EXPECTED ARRIVAL DATE
Madeline Rivera Rodriguez	Eng Engineer NAVFAC ATL	05 / 12 / 11 (MO. DAY YR.)	05 / 16 / 11 (MO. DAY YR.)
TRANSPORTE SIGNATURE	**COMPANY NAME**	**VEHICLE ID. NO.**	**DATE RECEIVED**
[illegible]	LMT	TRR 10161	05 / 16 / 11 (MO. DAY YR.)
FACILITY SIGNATURE			**DATE RECEIVED**
[illegible]			05 / 16 / 11 (MO. DAY YR.)

FILE PVL

WASTE MANAGEMENT

Pebbles Valley Landfill
Pebbles, KM64-8068- Tallaboa
Ph: (787) 836-2058

Original
Ticket# 134922

Customer Name RIGHTWAYENG RIGHTWAY ENVIRONM
Ticket Date 05/17/2011
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest NA
Destination
PO
Profile 103445PR (DECOM WATER)
Generator 169-NAVAL FACILITIES 169-NAVAL FACILITIES
Vehicle License

Carrier EMT
Vehicle# RP10161
Container
Driver HENRY REYES
Check#
Billing # 0000112
Gen EPA ID
Grid

Volume

Vehicle Description

	Time	Scale	Operator			
In	05/17/2011 12:23:27	Scale 1	avidale	Inbound	Gross	5091 lb*
Out	05/17/2011 12:23:30	Scale 1	avidale		Tare	3180 lb*
					Net	1911 lb
Comments			* Manual Weight		Tons	0.96

Product		LDX	Qty	UOM	Rate	Tax	Amount	Origin
1	Special Liquid-Eac 100		1	Each				
2	PGENV-T-Environmen 100			%				
3	FUEL-T-Fuel Surcha 100			%				

Total Tax
Total Ticket

Driver's Signature Henry Reyes

404WM

WASTE MANAGEMENT

Generator's Non-hazardous Waste Profile Sheet

Requested Disposal Facility: Penuelas Valley Landfill Profile Number: 103445PR

☐ Renewal for Profile Number: _____ Waste Approval Expiration Date: _____

☐ Check here if there are multiple generating locations for this waste. Attach additional locations.

A. Waste Generator Facility Information (must reflect location of waste generation/origin)

1. Generator Name: Naval Facilities Engineering, Atlantic Fleet Weapons Training Area
2. Site Address: West Vieques
3. City/ZIP: Vieques, 00765
4. State: PR
5. County: USA
6. Contact Name/Title: Pedro Tejada
7. Email Address: rwec@hughes.net
8. Phone: 787-630-9881
9. FAX: 787-857-6068
10. NAICS Code: 9999
11. Generator USEPA ID #: _____
12. State ID# (if applicable): _____

B. Customer Information ☐ same as above

P. O. Number: _____

1. Customer Name: Right Way Env. Contractors, Inc.
2. Billing Address: HC 72 Box 3744
3. City, State and ZIP: Naranjito, PR, 00719
4. Contact Name: Pedro Tejada
5. Contact Email: rwec@hughes.net
6. Phone: 787-630-9881 FAX: 787-857-6068
7. Transporter Name: _____
8. Transporter ID # (if appl.): _____
9. Transporter Address: _____
10. City, State and ZIP: _____

C. Waste Stream Information

1. DESCRIPTION

a. Common Waste Name: Decom water

State Waste Code(s): N/A

b. Describe Process Generating Waste or Source of Contamination:

Decom water generated during ECA investigation, Vieques, Puerto Rico
es una investigacion buscando a ver si hay cualquier tipo de contaminación hay varias areas en Vieques donde las agencias solicitan al Navy que estudie esa área en particular a veces basado en la anterior del area.

c. Typical Color(s): clear

d. Strong Odor? ☐ Yes ☑ No Describe: _____

e. Physical State at 70°F: ☐ Solid ☑ Liquid ☐ Powder ☐ Semi-Solid or Sludge ☐ Other: _____

f. Layers? ☑ Single layer ☐ Multi- layer ☐ NA

g. Water Reactive? ☐ Yes ☑ No If Yes, Describe: _____

h. Free Liquid Range (%): 100 to 100 ☐ NA(solid)

i. pH Range: 5 to 8 ☐ NA(solid)

j. Liquid Flash Point: ☐ < 140°F ☐ 140°- 199°F ☑ ≥ 200°F ☐ NA(solid)

k. Flammable Solid: ☐ Yes ☑ No

l. Physical Constituents: List all constituents of waste stream - (e.g. Soil 0-80%, Wood 0-20%): ☑ (See Attached)

Constituents (Total Composition Must be ≥ 100%)	Lower Range	Unit of Measure	Upper Range	Unit of Measure
1. Water				
2.				
3.				
4.				
5.				
6.				

2. ESTIMATED QUANTITY OF WASTE AND SHIPPING INFORMATION

a. ☐ One Time Event ☑ Base ☐ Repeat Event

b. Estimated Annual Quantity: 5 ☐ Tons ☐ Cubic Yards ☑ Drums ☐ Gallons ☐ Other (specify): _____

c. Shipping Frequency: every 3 months Units per ☐ Month ☑ Quarter ☐ Year ☐ One Time ☐ Other

d. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If yes, answer e.) ☐ Yes ☑ No

e. USDOT Shipping Description (if applicable): _____

3. SAFETY REQUIREMENTS (Handling, PPE, etc.): N/A

©2010 Waste Management, Inc.

Generator's Non-hazardous Waste Profile Sheet

103445PR

D. Regulatory Status (Please check appropriate responses)

1. Waste Identification:
   a. Does the waste meet the definition of a USEPA listed or characteristic hazardous waste as defined by 40 CFR Part 261? ☐ Yes ☑ No
      1. If yes, please complete a hazardous waste profile.
   b. Does the waste meet the definition of a state hazardous waste other than identified in D.1.a? ☐ Yes ☑ No
      1. If yes, please complete a hazardous waste profile.
2. Is this waste included in one or more of categories below (Check all that apply)? If yes, attach supporting documentation. ☐ Yes ☑ No
   ☐ Delisted Hazardous Waste ☐ Excluded Wastes Under 40CFR 261.4
   ☐ Treated Hazardous Waste Debris ☐ Treated Characteristic Hazardous Waste
3. Is the waste from a Federal (40 CFR 300, Appendix B) or state mandated clean-up? If yes, see instructions. ☐ Yes ☑ No
4. Does the waste represented by this waste profile sheet contain radioactive material? ☐ Yes ☑ No
   a. If yes, is disposal regulated by the Nuclear Regulatory Commission? ☐ Yes ☐ No
   b. If yes, is disposal regulated by a State Agency for radioactive waste/NORM? ☐ Yes ☐ No
5. Does the waste represented by this waste profile sheet contain Polychlorinated Biphenyls (PCBs)? ☐ Yes ☑ No
   (If yes, list in Chemical Composition - C.1.l)
   a. If yes, are the PCBs regulated by 40 CFR 761? ☐ Yes ☐ No
   b. If yes, is it remediation waste from a project being performed under the Self-Implementing option provided in 40 CFR 761.61(a)? ☐ Yes ☐ No
   c. If yes, were the PCBs imported into the US? ☐ Yes ☐ No
6. Does the waste contain untreated, regulated medical or infectious waste? ☐ Yes ☑ No
7. Does the waste contain asbestos? ☐ Yes ☑ No
   a. If Yes, ☐ Friable ☐ Non Friable
8. Is this profile for remediation waste from a facility that is a major source of Hazardous Air Pollutants (Site Remediation NESHAP, 40 CFR 63 subpart GGGGG)? ☐ Yes ☑ No
   a. If yes, does the waste contain <500 ppmw VOHAPs at the point of determination? ☐ Yes ☐ No

E. Generator Certifcation (Please read and certify by signature below)

By signing this Generator's Waste Profile Sheet, I hereby certify that all:

1. Information submitted in this profile and all attached documents contain true and accurate descriptions of the waste material;
2. Relevant information within the possession of the Generator regarding known or suspected hazards pertaining to this waste has been disclosed to WM/the Contractor;
3. Analytical data attached pertaining to the profiled waste was derived from testing a representative sample in accordance with 40 CFR 261.20(c) or equivalent rules; and
4. Changes that occur in the character of the waste (i.e. changes in the process or new analytical) will be identified by the Generator and disclosed to WM (and the Contractor if applicable) prior to providing the waste to WM (and the contractor if applicable).
5. Check all that apply:
   ☑ a. Attached analytical pertains to the waste. Identify laboratory & sample ID #'s and parameters tested: _____ # Pages: _____
   ☐ b. Only the analysis identified on the attachment pertain to the waste (identify by laboratory & sample ID #'s and parameters tested). Attachment #: _____
   ☐ c. Additional information necessary to characterize the profiled waste has been attached (other then analytical, such as MSDS). Indicate the number of attached pages: _____
   ☑ d. I am an agent signing on behalf of the Generator, and the delegation of authority to me from the Generator for this signature is available upon request.

Certification Signature: _____ Title: Environmental Engineer

Company Name: NAVFAC /ATLANTIC Name (Print): Pedro Ruiz

Date: 5-10-2011

©2010 Waste Management, Inc.

NON-HAZARDOUS WAM APPROVAL FORM

Requested Management Facility Penuelas Valley Landfill

Profile Number 103445PR Waste Approval Expiration Date 05/11/2012

APPROVAL DETAILS

Approval Decision ☑ Approved ☐ Not Approved Profile Renewal ☐ Yes ☑ No

Management Method: Solidification/Liquifix

Generator Name: Naval Facilities Engineering, Atlantic Fleet Weapons Training Area

Management Facility Precautions, Special Handling Procedures or Limitation on approval:

Additional Conditions:

WM Authorization Name: Clay Pfluger Title: Waste Approval Manager

WM Authorization Signature: Clay Pfluger Date: 05/11/2011

Agency Authorization (if Required): Date:

©2009 Waste Management. Inc.

Appendix G
Data Quality Evaluation

Contents

Section Page

G Data Quality Evaluation G-1

G.0 Data Quality Assessment G-1

G.1 Vieques ECA Sediment G-6

G.2 Vieques ECA Soil and Incremental Soil G-8

G.3 Vieques ECA Surface Water G-9

G.4 PARCC Considerations G-11

G.5 References G-12

Data Quality Evaluation

G.0 Data Quality Assessment

This 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 the potential releases, nature and extent of contamination, and estimating potentially associated human health and ecological risks. However, a particular result or group of results may not be “usable” for these purposes if other conditions apply. For example, if there were a hypothetical site where a TCE spill had occurred and the TCE data for many or all of the samples were rejected, the data may not be usable for making site-specific determinations even if all the non-TCE data were analytically sound and available for use by the project team. In order to avoid confusion of terms, this data quality evaluation differentiates the “availability” of results from “usability” of results. “Available” results are analytically sound and available for use by the project team to make decisions, even if they are not usable for a particular purpose.

The three major categories of data evaluation are laboratory performance, field collection performance (i.e. blank contamination), and matrix interferences. Evaluation of laboratory performance is a check for compliance with the method requirements; in other words, a check of whether the laboratory analyzed the samples within the limits of the analytical method. Additionally, a third-party validator (DataQual Environmental Services, LLC) conducted a review of the laboratory data to assess whether the analytical methods were within required control limits at the time of analysis. Evaluation of potential matrix interferences involves the review of several areas of results, including surrogate spike recoveries, matrix spike recoveries, and duplicate sample results. Evaluation of field collection performance, such as blank contamination and field duplicates, involves the review field QC and the determination of their effect on the sample results.

The data evaluation and validation is a multi-tiered approach. The process begins with an internal laboratory review, continues with a review by a third-party data validator, and ends with an overall review by the Navy contractor project chemistry team. The process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

This document presents the results of the data quality evaluation performed on the data set corresponding to Vieques ECA Decision Units 1-5 and background (sites), discrete soil, incremental soil, surface water, and sediment (matrices), and February 2-18, 2011 (date range).

G.0.1 Laboratory Internal Quality Control Review

Prior to releasing the analytical data, the laboratory (Test America-West Sacramento) reviewed both the sample and QC data to verify sample identity, instrument calibration, LOQs, dilution factors, numerical computations, accuracy of transcriptions, and chemical interpretations. In addition, the QC data were tabulated and the results reviewed to ascertain whether they were within the contract-required or laboratory-defined limits for accuracy and precision. Any non-conforming data were discussed in the data package cover letter and case narrative. The case narrative was then reviewed by the data validator and incorporated into the data validation report. If necessary, the exceedances were verified and qualifiers were applied based on this information.

G.0.2 Data Validation

A third-party data validator reviewed all data packages using the validation criteria outlined in the site-specific UFP-SAP Worksheets #34-36 (CH2M HILL, 2011). For the most part, these Worksheets reference the appropriate Region II SOP if such an SOP exists for that analysis method. Then, UFP-SAP limits are used in place of those referenced in the SOP. If a Region II SOP does not exist for the analysis method, then the data are validated against the limits in the UFP-SAP. Guidance and qualifiers are taken from related Region II SOPs or National Functional Guidelines. The following protocol was used for validation:

- For EXPLO via SW-846 8330B:
  - "Validation of Data, Nitroaromatics and Nitroamines by HPLC (SOP HW-16, Rev. 2)" (September, 2006)
  - UFP-SAP limits for accuracy/precision
- For EXPLO via SW-846 6850:
  - UFP-SAP QA/QC criteria referencing analytical methods and laboratory SOPs
  - Qualifiers from "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA, October, 2004)
- For METAL or FMETAL via 6010B, 6020, and 7196A:
  - UFP-SAP QA/QC criteria referencing analytical methods and laboratory SOPs
  - Qualifiers from "Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3 (SOP HW-2)" (September, 2006)
  - Guidance and qualifiers from "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (EPA, October, 2004) as needed

Although not subject to third-party data validation WCHEM and GRAINSIZE data were still subject to the verification and validation procedures outlined in Worksheets #34-36.

As stated above, the data validation process was separate from the laboratory's internal review. The process was specifically focused on the effects of the laboratory's performance and sample matrix on the analytical results. Areas of review consisted of holding time compliance, surrogate recovery accuracy, matrix spiked sample precision and accuracy, blank contamination, initial and continuing calibration accuracy and precision, laboratory control sample accuracy, internal standard response and retention time accuracy, instrument tune criteria accuracy, and duplicate sample precision (laboratory and field duplicates).

Multiple analyses are most-often the result of concentrations exceeding the calibration range or QC results outside of control limits. When multiple analyses were performed, the "best result" was selected for purposes of this data quality evaluation. Among multiple valid and/or invalid results, the "best result" is:

1. The non-rejected result
2. The result from the appropriate concentration range (dilution factor)
3. The detect when one or more result is detected and one or more result is nondetect
4. The greater of detects, and
5. The lesser of nondetects (U-Values).

Qualification of data is not an unusual occurrence. To define a laboratory QC exceedance and when a laboratory QC exceedance occurs, the laboratory refers to its in-house SOPs. The SOPs are based on DOD requirements, the requested analytical method, and accumulated laboratory experience. When a laboratory QC exceedance occurs, the situation may be acceptable or it may require further action by the laboratory, such as application of a laboratory qualifier or re-extraction and/or reanalysis of the sample. The data validator uses a separate set of QC criteria, based on guidance from the EPA region that applies to the samples. A laboratory QC exceedance may not constitute a data validation exceedance and a data validation exceedance may not constitute a laboratory QC exceedance. Data validation criteria exceedances may result in the qualification of or rejection of data, as deemed appropriate by the data validator.

The data validator examines each data point and determines any effects that QC exceedances have had. Most often, these effects dictate that the result or limit of detection (LOD) should be considered estimated, but is still available for use. The J-qualification, UJ-qualification, and U-qualification of results are common occurrences and have no adverse effect on the availability of that result to the project team for making decisions. J-qualified results are available, at the reported result, for use as detects as long as they are considered "estimated" by the project team. Human health risk assessment guidance suggests that these qualifiers "indicate uncertainty in the reported concentration of the chemical, but not in its assigned identity. Therefore, these data can be used just as positive

data with no qualifiers or codes." In addition, risk assessment guidance (EPA, 1989) suggests that one should use "J-qualified concentrations the same way as positive data that do not have this qualifier". U-qualified and UJ-qualified results are available, at the reported LOD or level, for use as non-detects as long as they are considered "non-detect," "not detected at significantly greater than that in an associated blank" or "non-detect, estimated LOD," as appropriate.

In extreme cases, a result is rejected and deemed to be unusable. "Unusable" in this instance is defined as a result that is not analytically sound and is not generally considered available for use by the project team. In some cases, the project team may still decide to use a rejected result. An example of this occurrence would be if a result is rejected because it is biased extremely high, yet it is still below the screening level (SL). A conservative decision may be made to consider this result a non-exceedance, even if its concentration was rejected. For that reason, it is important to examine why a result was rejected. For the most part, however, rejected results are not usable, and the R-qualifier is the only qualifier that has an adverse effect on the availability of data.

In large data sets, rejected results are often inconsequential because there are sufficient non-rejected data available to the project team. If there are enough non-rejected data or the project team is able to infer results from adjacent sampling locations or there is other site-specific information that can provide additional lines of evidence, it may not be necessary to know the concentrations of some rejected constituents. It may also not be necessary to prove a constituent's absence if there are sufficient additional lines of evidence.

G.0.3 Primary Data Validation Qualifiers

The following data validation qualifiers were applied to one or more analytical results:

- **U** - Not detected. Sample was analyzed for this parameter, but it was not detected at greater than the reported LOD. The data validator may also apply this qualifier to indicate that a concentration was not detected at significantly greater than that in an associated blank. Thus, this qualifier does not necessarily indicate a quality control exceedance.
- **UJ** – Not detected, LOD estimated. Sample was analyzed for this parameter, but it was not detected above the reported LOD. The LOD for this parameter is estimated due to a quality control exceedance.
- **J** - Concentration estimated. The parameter was positively identified and the associated numerical value is the approximate concentration of the parameter in the sample. Often, a J-qualifier is applied simply because the result was less than the limit of quantitation and thus does not necessarily indicate a quality control exceedance.
- **NJ** - Qualitative identification questionable due to poor resolution. The parameter was presumptively identified and the associated numerical value is the approximate concentration of the parameter in the sample.
- **R** - Rejected. The result was rejected because quality control limits were exceeded. It may or may not have been detected by the laboratory. The presence or absence of the parameter cannot be verified and the result generally is not usable as detected or not detected.
- **[No qualifier present] -** Detected. Qualification was not warranted.

G.0.4 Impact of Data Quality on Project Data Quality Objectives and Data Usability

The laboratories analyzed the samples in accordance with EPA SW-846 methods. The data packages were reviewed by a data validator taking guidance from USEPA Region II Validation procedures.

The laboratory utilized various qualifiers to represent "below reporting limit," "non-detect," and "detected." Any other extraneous laboratory qualifiers were superseded by data validation qualifiers. The data validator utilized J-qualifiers, NJ-qualifiers, UJ-qualifiers, U-qualifiers, and R-qualifiers to represent "estimated," "presumptively present at approximate quantity", "non-detect, estimated LOD," "non-detect or not detected at significantly greater than that in an associated blank," and "rejected," respectively. The only time the data validator changed a result's detect status was when J- or JB-qualifiers were changed to U-qualifiers (detect to non-detect) as a result

of blank contamination. There were also nine instances where R-qualifiers were applied to detected data as a result of a dual-column reproducibility or filtered metal results exceeding total metal results.

The J-, NJ-, and UJ-qualifiers indicate that some results are estimated. These qualifiers indicate that data are available for use as detects, detects, and non-detects, respectively. These qualifiers do not necessarily indicate a problem that adversely affects the availability of data. For example, J-qualifiers are often applied simply because results are below the quantitation limit.

Region II data validation guidance mandates the use of J- and UJ-qualifiers when QA/QC exceedances dictate their necessity. This is distinctly different from other EPA regions, such as Region I and Region III. In Region I, a data validator may use J^+ and J^--qualifiers to indicate that data are biased high or biased low, respectively. In Region III, a data validator may use K- and L-qualifiers to indicate that data are biased high or biased low, respectively. In Region III, a data validator may use UL-qualifiers to indicate that quantitation limits are biased low and may use B-qualifiers to indicate when results may be attributable to blank contamination. In Region II, if the direction of bias is known, it is not implied by the J- or UJ-qualifier. In Region II, if a result is attributable to blank contamination, it is U-qualified and is no longer distinguishable from results that are simply non-detect. The U-qualified value is elevated to the LOD if necessary. This supports the practice that J-qualified results, while estimated, are available for use as detects at their qualified concentration and U- and UJ-qualifiers are available for use as non-detects at their qualified LOD or level. In general, J-, UJ-, and U-qualified results are available for use as qualified for evaluating potential releases, the nature and extent of contamination, and estimating potentially associated human health and ecological risks.

It is a common occurrence for achieved LODs to be greater than SLs or for LODs to be elevated above what was expected or requested. In many cases, SLs are simply unreasonably low or the laboratory was forced, by the analytical method or sample matrices, to raise limits for various reasons. In the instance where non-detect LODs are greater than SLs, the results are available for use as non-detects, but their use adds uncertainty to the conclusions drawn. There are a variety of typical and potentially unavoidable reasons why the quantitation limits of non-detect results may exceed SLs:

- If an SL is unreasonably low, current instrumentation technology may not be able to achieve a LOD less than the SL.
- The laboratory-specific limits may have been established at a time when the SL was higher (less stringent) or not present, but the reporting is being done using new (more stringent) criteria. Published screening levels, such as EPA Regional Screening Levels, may change periodically as toxicity values are updated.
- 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 reporting limits will be elevated such that the concentrations and quantitation limits are reported on a dry-weight basis.

G.0.5 Comparison of Nondetects to Screening Levels

When evaluating the data and making decisions, the project team compares detected sample results to SLs in order to determine exceedances. For this project, the SLs are as follows:

- Soil (incremental and discrete) samples are compared to Adjusted Industrial Soil EPA Regional Screening Levels (RSLs) (June, 2011) and Soil Ecological Screening Values (ESVs).
- Sediment samples are compared to Adjusted Industrial Soil EPA RSLs (June, 2011) and Marine Sediment ESVs.
- Surface water samples are compared to Adjusted Tap Water EPA RSLs (June, 2011) and Marine Surface Water ESVs.

Nondetect results are also compared to SLs, typically during a risk assessment or exceedance screening, by comparing one-half the LOD to the SL. However, this is only done when the same constituent was detected in another sample of the same matrix at the same site. The assumption is that, if the constituent is present in a given sample of a particular matrix at a site, then it may also be present at low concentrations (less than the LOD) in a nondetect sample of the same matrix from the same site. However, when a constituent was not detected in any samples of a particular matrix at a site, then it is considered not present at the site in that matrix. In this instance, it is important to compare the nondetect results to the SL. If the nondetect results (LODs) are not low enough when compared to the SL, then it may be possible that the constituent is present in a sample at greater than the SL but not detected or reported by the laboratory instrumentation. This situation is a common occurrence and is not cause for alarm. There are various typical reasons why this occurs and is expected. Please refer to section G.0.4, above. Then, refer to Table G-1 for soil and incremental soil, sediment, and surface water. For the purpose of performing this comparison, the minimum of applicable SLs for each matrix (as defined above) is considered to be the SL for each combination of matrix, analysis group, and analyte. One row (combination of matrix, analysis group, and analyte) was generated if there was at least one instance where a nondetect U-Value (LOD or detected result U-qualified due to blank contamination) exceeded a SL.

The minimum and maximum U-Values are further presented in Table G-1. The minimum U-Value is generally understood as the lowest LOD that the instrumentation can practically report considering the conditions at the site. The maximum U-Value is then generally understood as the LOD adjusted for the worst conditions (i.e. greatest dilution factors, matrix interference, and percent moisture). Because there is not a large spread between the minimum and maximum U-Values, it is therefore concluded that the site conditions did not have a significant impact on the analysis for this data set. There are 2,185 nondetect (U- or UJ-qualified) data points in this data set. Of these, 166 nondetect data points exceeded the SL. These corresponded to 37 nondetect data points (three analytes; nitrobenzene, antimony, and arsenic) in sediment, 43 nondetect data points (two analytes; arsenic and selenium) in soil or incremental soil, and 86 nondetect data points (nitrobenzene, six METALs and FMETALs, and two more FMETALs) in surface water. In two cases (arsenic in soil or incremental soil and cadmium in surface water), the maximum U-Value exceeded the SL but the minimum U-Value did not. These are instances where the LOD is usually low enough, but conditions necessitated elevating the LOD in one or more samples. In the remaining cases, the minimum U-Value exceeded the SL. These are instances where the concentration range is not low enough to practically report an LOD at less than the SL. In these instances, however, where the LOD > SL, the instrumentation may still be able to report a result, if an analyte is detected in a sample at greater than the SL, if the DL is less than the SL.

Therefore, when a U-Value exceeds a SL, it is worthwhile to consider the DL. Note that DLs, as reported by the laboratory and as presented in Table G-1, are “Adjusted MDLs” in that they are adjusted for dilution factors, matrix interference, etc. This is synonymous with the adjustment of nondetect results (U-Values or LODs), and also detected results. The DL is the level at which the laboratory is likely to detect and report a constituent, if

present in the sample, at greater than background noise. Furthermore, the laboratory will report (J-qualified as applicable) any detections at greater than the DL. The minimum and maximum DLs are also presented in Table G-1. Yellow rows are those where the U-Value is greater than the SL, but the DL is less than the SL. A total of eight rows (combinations of matrix, analysis group, and constituent; corresponding to 67 results) correspond to instances where the U-Value is greater than the SL but the DL is still less than the SL

A total of 12 rows (corresponding to 86 points, shown in orange and pink) correspond to instances where the U-Value is greater than the SL and the DL is also greater than the SL. In many cases, despite this phenomenon, the data user is still forced to make a conservative decision due to detected exceedances in the same sample and within the same analysis group. For example, the nondetect DL for filtered antimony in VEECA-5SW01-0211 exceeded the HHRA screening limit. Therefore, one may be tempted to say that the data user cannot make sample-specific decisions for filtered metals in VEECA-5SW01-0211 because he or she cannot demonstrate that filtered antimony is absent at the HHRA screening limit. However, the data user must also acknowledge that the same sample (VEECA-5SW01-0211) exceeded the HHRA limit for filtered cobalt and filtered selenium and also exceeded the Eco limit for filtered iron and filtered copper. Therefore, because the sample exceeded for FMETALs overall, the DL v. SL exceedance for filtered antimony in VEECA-5SW01-0211 is largely inconsequential. Such instances (nondetect DL exceeds screening limit but there is another detected exceedance in the same sample for the same analysis group) are highlighted in orange on Table G-1. The vast majority of DL v. SL exceedances fall into this category.

In the remaining instances (rows highlighted in pink on Table G-1), there was at least one DL v. SL exceedance and there was no detected exceedance in the same sample for the same analysis group. This occurred for only two points: arsenic and selenium in VEECA-1SB02-1H02-0211. This phenomenon is due to analysis of VEECA-1SB02-1H02-0211 for SW-846 6020 metals using a 25X dilution factor due to matrix interference.

For these instances where the DL is greater than the SL, the data user must understand that an analyte may be present in a sample at or at greater than the SL, but the laboratory instrumentation may not be sensitive enough to detect it. This particular sample, VEECA-1SB02-1H02-0211, happens to have a field duplicate (VEECA-1SB02P-1H02-0211) which exceeded the HHRA SL for chromium. The data conservatively uses the greater of results between field duplicates; therefore, the fact that the DL is greater than the SL for arsenic and selenium in VEECA-1SB02-1H02-0211 does not prevent the data user from making decisions for the station in this case. There was another detected exceedance for the same analysis group within the same depth at the same location.

G.0.6 Laboratory Qualifications, Data Validation Qualifiers, Data Validation Reason Codes, Data Availability, and Data Use

Please refer to Table G-2. For the complete data set, all combinations of laboratory qualifier, data validation qualifier, and data validation qualifier are provided. For each combination, the count (number of results that possess this combination) is provided as well as the determination of whether such a result is available for use as reported, available for use as qualified, or not available for use (rejected). Totals for each are provided. In addition, the procedure used for qualification is described in addition to the reason for qualification.

A total of 88.93% of the data are available for use as reported by the laboratory. A total of 9.471% of the data are available for use as qualified by the data validator. Altogether, a total of 98.40% of the data are available for use, qualified by applicable. The UFP-SAP project completeness goal of “95% available data” was met for this data set and overall, the data completeness is excellent. A total of 1.597% of the data are rejected and not available for use.

G.1 Vieques ECA Sediment

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the sediment data within the Vieques ECA Report, as well as to provide an assessment of data usability. Sediment samples were collected by CH2M HILL, Inc. on February 10, 2011.

G.1.1 Sediment Explosives

8330B-List explosives (nitroaromatics/nitroamines, PETN, NG, and 3,5-DNA) were analyzed via SW-846 8330B. Perchlorate was analyzed via SW-846 6850. The validation process resulted in the following qualifiers for results in the explosives fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
sediment	EXPLO	U		306	100.0%
				306	100.0%

100.0% not R-flagged and available for use

G.1.2 Sediment Grain Size

Grain size (sieve-only, no hydrometer) was analyzed via ASTM D422. The validation process resulted in the following qualifiers for results in the grain size fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
sediment	GRAINSIZE			240	100.0%
				240	100.0%

100.0% not R-flagged and available for use

G.1.3 Sediment Metals

ILM05-list metals (not including mercury or cyanide) were analyzed via SW-846 6010B and 6020. Hexavalent chromium was analyzed via SW-846 7196A. The validation process resulted in the following qualifiers for results in the metals fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
sediment	METAL			243	62.15%
sediment	METAL	U		77	19.69%
sediment	METAL	J		52	13.30%
sediment	METAL	UJ	MSL	17	4.348%
sediment	METAL	J	FD	2	0.5115%
				391	100.0%

100.0% not R-flagged and available for use

G.1.4 Sediment Wet Chemistry

Wet chemistry (pH, TOC, and %Moisture) were analyzed via SW-846 9045C, Lloyd Kahn, and ASTM D2216, respectively. The validation process resulted in the following qualifiers for results in the wet chemistry fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
sediment	WCHEM			51	100.0%
				51	100.0%

100.0% not R-flagged and available for use

G.2 Vieques ECA Soil and Incremental Soil

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the soil and incremental soil data within the Vieques ECA Report, as well as to provide an assessment of data usability. Soil and incremental soil samples were collected by CH2M HILL, Inc. on February 2 through February 18, 2011.

G.2.1 Soil Explosives

8330B-List explosives (nitroaromatics/nitroamines, PETN, NG, and 3,5-DNA) were analyzed via SW-846 8330B. Perchlorate was analyzed via SW-846 6850. For incremental samples, analysis was following 8330B processing. The validation process resulted in the following qualifiers for results in the explosives fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
soil	EXPLO	U		1053	91.41%
soil	EXPLO	R	GBSL	59	5.122%
soil	EXPLO	U	GBL	15	1.302%
soil	EXPLO	J		12	1.042%
soil	EXPLO	U	EBL	4	0.3472%
soil	EXPLO	NJ	2C	4	0.3472%
soil	EXPLO	R	2C	3	0.2604%
soil	EXPLO	J	2C	2	0.1736%
				1152	100.0%

94.62% not R-flagged and available for use

The majority of R-flags (59 of 62 R-flags) were applied due to extremely low recovery in the grinding blank spike. This QA/QC sample is a certified reference material which contains precise concentrations of the target analytes. It is processed identically to the samples. Because some analytes were characterized by extremely low recovery in the grinding blank spike, it is possible that the grinder would also cause low recovery for the same analytes in the samples. Therefore, related nondetects were R-qualified as “rejected” by the data validator. The remaining three R-qualified results were due to poor dual-column reproducibility, which is a precision exceedance.

R-qualified results are not available for use by the project team, but the data user can confidently draw conclusions with the available data in the overall dataset. In this case, the affected analytes were 3-nitrotoluene and nitrobenzene (due to low grinding blank spike recovery) and 1,3,5-trinitrobenzene and 2,4-dinitrotoluene (due to poor dual-column reproducibility). For 3-nitrotoluene in incremental soil, there were 30 rejected nondetects associated with one or more failing grinding blank spikes and seven available nondetects associated with one or more passing grinding blank spikes. There are also 27 available nondetects for this analyte in discrete soil. There were no 3-nitrotoluene detects. For Nitrobenzene in incremental soil, there were 29 rejected nondetects associated with one or more failing grinding blank spikes and seven available nondetects associated with one or more passing grinding blank spikes. There was one available detected result in incremental soil. There are also 27 available nondetects for this analyte in discrete soil. For 1,3,5-trinitrobenzene and 2,4-dinitrotoluene, there were only the three rejected results and the remaining 125 results are available for use in soil and incremental soil.

G.2.2 Soil Metals

ILM05-list metals (not including mercury or cyanide) were analyzed via SW-846 6010B and 6020. Hexavalent chromium was analyzed via SW-846 7196A. The validation process resulted in the following qualifiers for results in the metals fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
soil	METAL			898	50.06%
soil	METAL	U		373	20.79%
soil	METAL	J		188	10.48%
soil	METAL	UJ	MSL	97	5.407%
soil	METAL	J	MSL	61	3.400%
soil	METAL	J	MSH	39	2.174%
soil	METAL	J	GBL	39	2.174%
soil	METAL	J	SD	38	2.118%
soil	METAL	J	CCH	36	2.007%
soil	METAL	J	FD	10	0.5574%
soil	METAL	UJ	SD	8	0.4459%
soil	METAL	U	GBL	4	0.2230%
soil	METAL	UJ	GBL	1	0.05574%
soil	METAL	U	EBL	1	0.05574%
soil	METAL	J	MDP	1	0.05574%
				1794	100.0%

100.0% not R-flagged and available for use

G.2.3 Soil Wet Chemistry

Wet chemistry (pH and %Moisture) were analyzed via SW-846 9045C and ASTM D2216, respectively. The validation process resulted in the following qualifiers for results in the wet chemistry fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
soil	WCHEM			64	100.0%
				64	100.0%

100.0% not R-flagged and available for use

G.3 Vieques ECA Surface Water

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the surface water data within the Vieques ECA Report, as well as to provide an assessment of data usability. Surface water samples were collected by CH2M HILL, Inc. on February 9, 2011.

G.3.1 Surface Water Explosives

8330B-List explosives (nitroaromatics/nitroamines, PETN, NG, and 3,5-DNA) were analyzed via SW-846 8330B. Perchlorate was analyzed via SW-846 6850. For incremental samples, analysis was following 8330B processing. The validation process resulted in the following qualifiers for results in the explosives fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
surface water	EXPLO	U		108	100.0%
				108	100.0%

100.0% not R-flagged and available for use

G.3.2 Surface Water Filtered Metals

ILM05-list filtered metals (not including mercury or cyanide) were analyzed via SW-846 6010B and 6020. Hexavalent chromium was analyzed via SW-846 7196A. The validation process resulted in the following qualifiers for results in the filtered metals fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
surface water	FMETAL	U		66	47.83%
surface water	FMETAL			26	18.84%
surface water	FMETAL	J		24	17.39%
surface water	FMETAL	UJ	HT	6	4.348%
surface water	FMETAL	J	MSH	6	4.348%
surface water	FMETAL	J	CCH	6	4.348%
surface water	FMETAL	R	OT	4	2.898%
				138	100.0%

97.10% not R-flagged and available for use

The R-flags were applied due to filtered metals concentrations exceeding the corresponding total concentration (precision exceedance). R-qualified results are not available for use by the project team, but the data user can often work around such gaps. In this case, the affected analytes were total and filtered selenium in VEECA-5SW02-0211, VEECA-5SW03-0211, and VEECA-5SW05-0211 and total and filtered nickel in VEECA-5SW04-0211. This issue does not affect total and filtered selenium and total and filtered nickel results in the other surface water samples where the results were not rejected. In addition, there are available total and filtered selenium and total and filtered nickel results for VEECA-5SW01-0211.

G.3.3 Surface Water Metals

ILM05-list metals (not including mercury or cyanide) were analyzed via SW-846 6010B and 6020. Hexavalent chromium was analyzed via SW-846 7196A. The validation process resulted in the following qualifiers for results in the metals fraction:

Matrix	Analysis Group	Validator Qualifier	Reason Code	Count	Percent
surface water	METAL	U		43	31.16%
surface water	METAL			42	30.43%
surface water	METAL	J		31	22.46%
surface water	METAL	UJ	HT	6	4.348%
surface water	METAL	J	MSH	6	4.348%
surface water	METAL	J	CCH	6	4.348%
surface water	METAL	R	OT	4	2.899%
				138	100.0%

97.10% not R-flagged and available for use

The R-flags were applied due to filtered metals concentrations exceeding the corresponding total concentration (precision exceedance). Refer to section G.3.2, above, for a discussion of the rejected results.

G.4 PARCC Considerations

G.4.1 Precision

Precision is defined as the agreement between duplicate results and was characterized by comparing duplicate matrix spike recoveries, laboratory replicates, and field duplicate sample results. For this data set, precision was also assessed by examining dual-column reproducibility (percent difference between instrument columns) and by comparing total metals results to filtered metals results. There is no actual significant negative impact on precision because very few data points were deemed unusable (rejected) due to precision exceedances (total v. filtered metals results).

G.4.2 Accuracy

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. For organic analyses, each sample was spiked with surrogate compounds; and for organic and inorganic analyses, an MS/MSD and LCS were spiked with a known parameter concentration before preparation. Internal standards also provide a measure of accuracy. Internal standards, surrogates and MS/MSD provide a measure of the matrix effects on the analytical accuracy. LCS demonstrates accuracy of the method and the laboratory's ability to meet the method criteria. Accuracy is also assessed by calibration recoveries. There is no actual significant negative impact on accuracy because few data points were deemed unusable (rejected) due to accuracy exceedances (grinding blank spike recoveries).

G.4.3 Representativeness

Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition (in this case, nature and extent of contamination). Representativeness is a subjective parameter and is used to evaluate the efficacy of the sample planning design. In terms of data quality, representativeness was assured because the sampling team following approved standard operating procedures for sample collection and handling, and the laboratory followed approved standard operating procedures for sample handling, preparation, and analysis. A minor exception, not affecting the availability or usability of results, applies to hexavalent chromium and filtered hexavalent chromium in surface water at decision unit 5. Samples were shipped on the day of collection, received the morning after, but due to a minor laboratory delay, were not analyzed until the following day. As described in Table G-2, the results are available for use at the reported LODs as long as the data user understands that they are "not detected, LOD estimated" due to a slight holding time exceedance.

G.4.4 Completeness

For purposes of this DQE, completeness is defined as the percentage of measurements that are judged to be valid; validity being defined by the DQOs. Therefore, completeness is calculated as the number of analytically-sound results that are available for use compared to the total number of measurements made. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review; EPA 540/R-99/008; October, 1999, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; EPA 540-R-04-004; October, 2004, SOP HW-22; Nitroaromatics and Nitroamines by HPLC (Rev. 2, September, 2006); and Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3 (Rev. 13, September, 2006) designate all results except those R-qualified as "rejected" to be available for use as analytically-sound results. The R-qualifier is the only qualifier that negatively affects a data point's availability. Completeness is provided, above, for each combination of matrix and analysis group.

The overall completeness goal of 95% was met for this data set; it was also met for the individual matrices.

G.4.5 Comparability

Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are sample collection and handling techniques, sample matrix, and analytical methods. In this case, because approved standard operating procedures were used for sample collection and handling, common sample matrices were evaluated (sediment, soil, incremental soil,

surface water) and EPA SW-846 methods were utilized, the data user may express confidence in the fact that this data set is comparable to others of acceptable data quality. In addition, comparability is controlled by the other PARCC parameters because data sets can be compared with confidence only when precision and accuracy are known. Except in the case of rejected data, precision and accuracy were demonstrated to be acceptable, and the data user may be confident that this data set is comparable to others of high data quality.

G.5 References

ORNL. 2011. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. [Online]. June.

CH2M HILL. 2011. *Final Remedial Investigation Sampling and Analysis Plan Eastern Conservation Area*. January.

EPA. 2006. *Validation of Data, Nitroaromatics and Nitroamines by HPLC*. SOP HW-16, Rev. 2, September.

EPA. 2006. *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3.* SOP HW-2, September.

EPA. 2004. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* October.

EPA. 1989. *Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual.* EPA/540/1-89/002, Part A, October.

TABLE G-1

Comparison of Nondetects to Screening Levels

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Matrix	Analysis Group	Analyte	CAS	Eco Limit	HHRA Limit	Units	# Detects	min Detect	max Detect	# Exceeds	# NDs	min ND	max ND	# U-Value Exceeds	min ND DL	max ND DL	# ND DLs Exceed	# ND DLs Exceed when no Related Exceedance[1]
SD	EXPLO	Nitrobenzene	98-95-3	21	24000	UG_KG					17	29	30	17	17	18		
SD	METAL	Antimony	7440-36-0	2	41	MG_KG					17	2.6	4	17	1.2	1.9		
SD	METAL	Arsenic	7440-38-2	8.2	1.6	MG_KG	14	1.6	3.3	13	3	2	2.2	3	1	1.1		
SO or SMI	METAL	Arsenic	7440-38-2	18	1.6	MG_KG	60	0.47	71.8	56	18	0.34	8.8	17	0.17	4.4	4	1
SO or SMI	METAL	Selenium	7782-49-2	0.52	510	MG_KG	52	0.29	2.7	43	26	1.2	5.8	26	0.58	2.9	26	1
SW	EXPLO	Nitroglycerin	55-63-0		0.37	UG_L					6	0.5	0.52	6	0.33	0.34		
SW	FMETAL	Antimony	7440-36-0	4300	1.5	UG_L					6	4	4	6	2	2	6	
SW	FMETAL	Arsenic	7440-38-2	1.4	0.045	UG_L	1	1.1	1.1	1	5	2	2	5	1	1	5	
SW	FMETAL	Beryllium	7440-41-7	100	7.3	UG_L					6	10	10	6	3	3		
SW	FMETAL	Cadmium	7440-43-9	8.85	1.8	UG_L					6	10	10	6	10	10	6	
SW	FMETAL	Chromium	7440-47-3		0.043	UG_L					6	4	4	6	1.5	1.5	6	
SW	FMETAL	Chromium (hexavalent)	18540-29-9	50.4	0.043	UG_L					6	5	5	6	2	2	6	
SW	FMETAL	Thallium	7440-28-0	21.3	0.037	UG_L					6	1	1	6	0.5	0.5	6	
SW	FMETAL	Zinc	7440-66-6	85.6	1100	UG_L					6	100	100	6	30	30		
SW	METAL	Antimony	7440-36-0	4300	1.5	UG_L					6	4	4	6	2	2	6	
SW	METAL	Beryllium	7440-41-7	100	7.3	UG_L					6	10	10	6	3	3		
SW	METAL	Cadmium	7440-43-9	8.85	1.8	UG_L					6	0.5	10	5	0.5	10	5	
SW	METAL	Chromium (hexavalent)	18540-29-9	50.4	0.043	UG_L					6	5	5	6	2	2	6	
SW	METAL	Thallium	7440-28-0	21.3	0.037	UG_L	2	0.54	0.7	2	4	1	1	4	0.5	0.5	4	
SW	METAL	Zinc	7440-66-6	85.6	1100	UG_L					6	100	100	6	30	30		

One row is presented for each combination of matrix, analysis group, and analyte with at least one U-Value v. screening level exceedance.

At least one DL exceeds a screening level.

[1]At least one DL exceeds a screening level without a related exceedance (detected exceedance in the same analysis group for the same sample).

TABLE G-2

Data Availability and Use

Eastern Conservation Area Remedial Investigation Report

Former VNTR, Vieques, Puerto Rico

Lab_Qual	DV_Qual	DV_Qual_Code	Count	Available as Reported	Available as Qualified	Not Available	Comment
U	U		1999	45.62%			Not detected by the laboratory. The reported result is the LOD. No further qualification was necessary.
			1405	32.06%			Detected by the laboratory. No further qualification was necessary.
J	J		303	6.915%			Detected by the laboratory at less than the LOQ. No further qualification was necessary. The result is available for use at the reported value as long as the data user understands that it is "estimated".
U	UJ	MSL	112		2.556%		Not detected by the laboratory. The reported result is the LOD. The result is available for use at the reported LOD as long as the data user understands that it is "not detected, LOD estimated" due to low matrix spike recovery.
B			90	2.054%			Detected by the laboratory. Although blank contamination was noted, no further qualification was necessary.
U	R	GBSL	59			1.346%	Not detected by the laboratory. The reported result is the LOD. The result was rejected and is not available for use due to extremely low grinding blank spike recovery. This corresponds to NB results in 29 SMI samples and 3-NT results in the same samples plus one more.
	J	MSH	44		1.004%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to high matrix spike recovery.
	J	MSL	43		0.981%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to low matrix spike recovery.
	J	CCH	40		0.9128%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to high recovery in a continuing calibration.
RLA			29	0.6618%			Detected by the laboratory. Although a miscellaneous QA/QC exceedance was noted, no further qualification was necessary.
	J	SD	27		0.6162%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to serial dilution (precision exceedance).
UG	U		27	0.6162%			Not detected by the laboratory. The reported result is the LOD. Although a miscellaneous QA/QC exceedance was noted, no further qualification was necessary.
J	J	GBL	26		0.5933%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to grinding blank contamination.
BRLA			24	0.5477%			Detected by the laboratory. Although a miscellaneous QA/QC exceedance was noted, no further qualification was necessary.

TABLE G-2
Data Availability and Use
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Lab_Qual	DV_Qual	DV_Qual_Code	Count	Available as Reported	Available as Qualified	Not Available	Comment
J	J	MSL	18		0.4108%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to low matrix spike recovery.
G			16	0.3651%			Detected by the laboratory. Although a miscellaneous QA/QC exceedance was noted, no further qualification was necessary.
JB	U	GBL	15		0.3423%		Detected by the laboratory at less than the LOQ and blank contamination was noted. The data validator determined that the detect was not significantly high compared to the blank contamination, applied a U-flag, and raised the result to the LOD (if less than the LOD). The result is available for use as a nondetect as long as the data user understands that it was "not detected at significantly greater than that in an associated blank" due to grinding blank contamination.
	J	GBL	13		0.2967%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to grinding blank contamination.
U	UJ	HT	12		0.2738%		Not detected by the laboratory. The reported result is the LOD. The result is available for use at the reported LOD as long as the data user understands that it is "not detected, LOD estimated" due to a slight holding time exceedance.
J	J	SD	11		0.2510%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to serial dilution (precision exceedance).
	J	FD	9		0.2054%		Detected by the laboratory. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to field duplicate reproducibility (precision exceedance).
J	J	CCH	8		0.1826%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to high recovery in a continuing calibration.
U	UJ	SD	8		0.1826%		Not detected by the laboratory. The reported result is the LOD. The result is available for use at the reported LOD as long as the data user understands that it is "not detected, LOD estimated" due to serial dilution (precision exceedance).
J	J	MSH	7		0.1597%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to high recovery in a matrix spike.
	R	OT	4			0.09128%	Detected by the laboratory. The result was rejected and is not available for use due to "other" (FMETAL result exceeds METAL result; precision exceedance).

TABLE G-2
Data Availability and Use
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Lab_Qual	DV_Qual	DV_Qual_Code	Count	Available as Reported	Available as Qualified	Not Available	Comment
J	U	GBL	4		0.0913%		Detected by the laboratory at less than the LOQ. The data validator determined that the detect was not significantly high compared to the blank contamination, applied a U-flag, and raised the result to the LOD (if less than the LOD). The result is available for use as a nondetect as long as the data user understands that it was "not detected at significantly greater than that in an associated blank" due to grinding blank contamination.
JB	U	EBL	4		0.0913%		Detected by the laboratory at less than the LOQ and blank contamination was noted. The data validator determined that the detect was not significantly high compared to the blank contamination, applied a U-flag, and raised the result to the LOD (if less than the LOD). The result is available for use as a nondetect as long as the data user understands that it was "not detected at significantly greater than that in an associated blank" due to equipment blank contamination.
JG	J		4	0.0913%			Detected by the laboratory at less than the LOQ. Although a miscellaneous QA/QC exceedance was noted, no further qualification was necessary. The result is available for use at the reported value as long as the data user understands that it is "estimated".
JPG	NJ	2C	4		0.0913%		Detected by the laboratory at less than the LOQ and miscellaneous QA/QC exceedances were noted. The data validator determined that qualitative identification was questionable due to poor resolution. The result is available for use at the reported value as long as the data user understands that it is "tentatively identified, estimated" due to poor dual-column reproducibility (precision exceedance).
JPG	R	2C	3			0.06846%	Detected by the laboratory at less than the LOQ and miscellaneous QA/QC exceedances were noted. The result was rejected and is not available for use due to poor dual-column reproducibility (precision exceedance).
G	J	FD	2		0.0456%		Detected by the laboratory and a miscellaneous QA/QC exceedance was noted. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to field duplicate reproducibility (precision exceedance).
J	R	OT	2			0.04564%	Detected by the laboratory at less than the LOQ. The result was rejected and is not available for use due to "other" (FMETAL result exceeds METAL result; precision exceedance).
JPG	J	2C	2		0.0456%		Detected by the laboratory at less than the LOQ and miscellaneous QA/QC exceedances were noted. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to poor dual-column reproducibility (precision exceedance).

TABLE G-2
Data Availability and Use
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

Lab_Qual	DV_Qual	DV_Qual_Code	Count	Available as Reported	Available as Qualified	Not Available	Comment
U	R	OT	2			0.04564%	Not detected by the laboratory. The reported result is the LOD. The result was rejected and is not available for use due to "other" (FMETAL result exceeds METAL result; precision exceedance).
UG	UJ	MSL	2		0.0456%		Not detected by the laboratory and a miscellaneous QA/QC exceedance was noted. The reported result is the LOD. The result is available for use at the reported LOD as long as the data user understands that it is "not detected, LOD estimated" due to low matrix spike recovery.
J	J	FD	1		0.0228%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to field duplicate reproducibility (precision exceedance).
J	J	MDP	1		0.0228%		Detected by the laboratory at less than the LOQ. The result is available for use at the reported value as long as the data user understands that it is "estimated" due to a MS/MSD precision exceedance.
J	U	EBL	1		0.0228%		Detected by the laboratory at less than the LOQ. The data validator determined that the detect was not significantly high compared to the blank contamination, applied a U-flag, and raised the result to the LOD (if less than the LOD). The result is available for use as a nondetect as long as the data user understands that it was "not detected at significantly greater than that in an associated blank" due to equipment blank contamination.
J	UJ	GBL	1		0.0228%		Detected by the laboratory at less than the LOQ. The data validator determined that the detect was not significantly high compared to the blank contamination, applied a U-flag, and raised the result to the LOD (if less than the LOD). An additional QA/QC exceedance was noted which warranted the application of a J-flag (resulting in a UJ-flag). The result is available for use as a nondetect as long as the data user understands that it was "not detected at significantly greater than that in an associated blank, LOD estimated" due to grinding blank contamination.
			Totals:	88.93%	9.471%	1.597%	98.40% of the data are available for use, qualified as applicable. The UFP-SAP completeness goal of "95% available data" was met.

Appendix H
SSL Calculation Details

UXO 1 Leachability Evaluation using EPA's SSL Calculations

1.1 UXO 1 Site-specific Soil Screening Levels for Leaching to Groundwater

Site-specific soil screening levels (SSLs) have been developed for UXO 1. The approach used to develop the SSLs follows EPA's: *Soil Screening Guidance* (July 1996a and 1996b) and the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (2002). The basis of the approach is that infiltrating precipitation may leach chemicals from the soil and transport the chemicals to the uppermost groundwater. The leachate is then diluted by the lateral flow within the groundwater bearing unit. The approach assumes that a hypothetical future groundwater user is present on the immediate downgradient boundary of the site.

SSLs were calculated for each chemical detected in soil. Each SSL was calculated by the two methods presented within the EPA guidance: 1) infinite source model and 2) mass limited model. The infinite source calculation assumes that sufficient contaminant mass is present within the vadose zone that it is not possible to leach the entire mass over an exposure duration of 70 years. In some circumstances the infinite mass approach is not appropriate because of the limited amount of contaminant mass present in the vadose zone, which might completely leach out over a period of less than 70 years. The mass limited SSLs represent the lower limit of the SSL and are highly conservative because the underlying assumption is that 100 percent of the chemical leaches out over a 70 year period resulting in an average groundwater concentration equal to the groundwater protection standard. If the mass limited SSL (SSL_{ML}) exceeds the infinite source SSL (SSL_{IS}), the SSL_{ML} was chosen as the appropriate value, otherwise the SSL_{IS} was chosen.

Two sets of calculations were performed; one for the beach area and one for all other parts of the ECA. The areas were separated because the beach sediment had less organic carbon and the other areas had similar organic carbon content, which is critical in the calculation of the SSLs for organic chemicals.

1.2 Infinite Source Calculations

SSL_{IS} is based on an equilibrium partitioning equation that assumes a chemical in the subsurface is in equilibrium between the solid, liquid and gaseous phases present in the vadose zone. Therefore, the chemicals in the vadose zone may exist in three states: sorbed to soil particles, dissolved in the soil moisture, and in a gaseous phase in the air-filled soil pores. This approach assumes that the soil moisture (leachate) will migrate downward to the underlying water table. Typically, lateral groundwater flux within the underlying aquifer is much greater than the vertical recharge and a dilution attenuation factor has been used in calculating the SSL.

Infinite source SSLs were calculated using:

$$SSL_{IS} = C_w \times \left[K_d + \frac{(\theta_w + \theta_a H')}{\rho_b} \right]$$

The input parameters to the equilibrium equation include:

- **Target leachate concentration** (C_w): the target leachate concentration is the groundwater protection standard multiplied by the dilution attenuation factor (DAF). The groundwater protection standard has been chosen from EPA's Maximum Contaminant Levels (MCLs) or, if an MCL has not been developed, then EPA's Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (May 2011) were used. The screening level for water is based on residential tap water usage with a target cancer risk of 10^{-6} or a noncancer hazard index of 1.

- **Dilution attenuation factor (DAF):** the DAF was included as per the EPA guidance document as the only attenuation mechanism accounted for in the lateral groundwater transport process. Sorption, degradation (biological or chemical), or other attenuation mechanisms are not accounted for in the calculations. Calculation of the DAF requires site specific hydraulic parameters to estimate the lateral flux of groundwater. There are no groundwater testing data available for the ECA; therefore, a default value of 10 has been used as the DAF. EPA recommends a default value of 20 as being protective of a 0.5-acre source area. Although the total size of the ECA is larger than one-half acre, data collected suggest there are no source areas of contaminated soil larger than one-half acre given the distribution of chemicals and MEC items found at the site. Therefore, a DAF of 10 is a conservative estimate of the effect of dilution given EPA's recommendation of a DAF of 20.

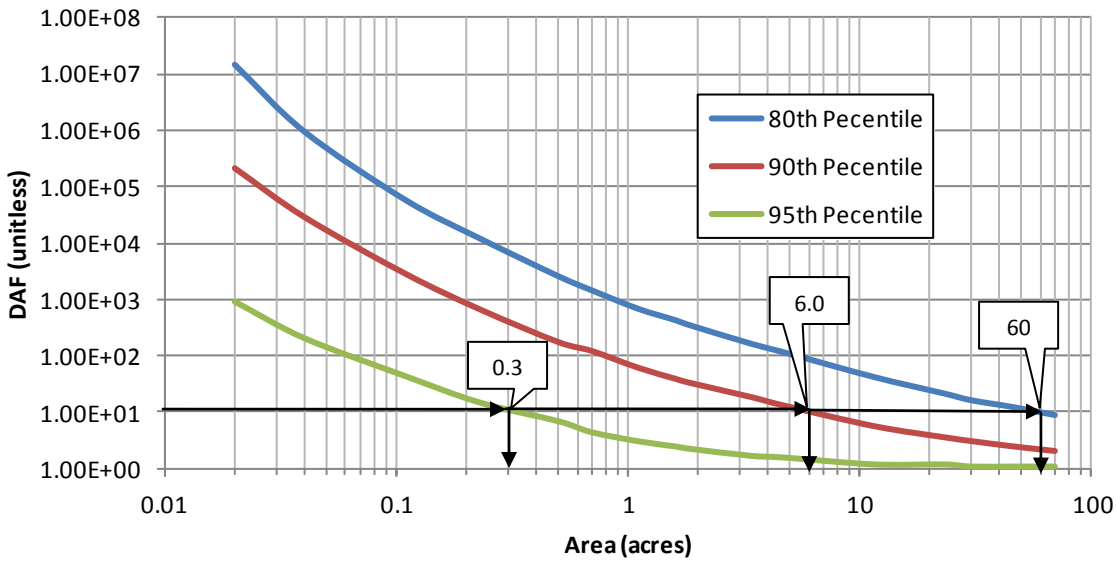
  Additional Notes:

  - The DAF accounts for some of the uncertainties and conservative calculations used to derive the SSLs such as biodegradation of organic compounds in the vadose or saturated zones and redistribution of dissolved phase chemicals to the matrix via sorption as the chemicals are transported vertically through the vadose zone then laterally through saturated zone.
  - Although the total size of the ECA is larger than one-half acre, source areas of contaminated soil are considerably smaller based on the data gathered across the ECA.
  - For very small sites (i.e., small areas of contamination), such as what may be considered for the very discrete exceedances of the SSLs observed at the ECA, DAFs on the order of 1,000 and significantly higher are predicted (EPA, 1996)

  The lines of evidence have been described above in terms of the intentionally conservative calculations of the SSLs. The lines of evidence include:

  - SSLs do not account for attenuation through adsorption as the infiltration moves vertically through the vadose zone or laterally through groundwater.
  - SSLs do not account for chemical or biological degradation of chemicals
  - SSLs are based on the premise that the entire vadose zone is contaminated
  - Most SSLs are based on an infinite mass model

Site specific data to calculate a DAF for the ECA do not exist; however, EPA's Technical Background Document (TBD) for the Development of Soil Screening Levels (referenced above) provides the basis for demonstrating that a DAF of 10 is both conservative and protective of the environment. In order to select a default DAF for the case when site specific data do not exist, EPA conducted modeling of multiple scenarios as documented in the TBD. The modeling effort resulted in the recommendation of a default DAF of 20. The graph below illustrates the relationship of DAF to contaminated area as modeled in the TBD:



The graph above shows that a DAF of 10 is protective of a contaminated soil area of 0.3 acre with a 95 percent probability (percentile of modeled population results). At the 90th percent probability the DAF of 10 is protective of a 6 acre contaminated parcel, and at an 80th percent probability it is protective of a 60 acre contaminated parcel. The data collected at UXO 1 indicate there are only very localized occurrences of contamination (i.e., isolated occurrences of explosives (a very small fraction of the total 135-acre area), and metals attributable to background); therefore, the DAF of 10 is appropriately conservative and protective of the environment.

- **Soil-to-water partition coefficient (K_d)**: K_d values are both chemical specific and site specific. The K_d for organic compounds is the product of the organic carbon-to-water partition coefficient (K_{oc}) and the soil fraction organic carbon (foc). The K_{oc} is chemical specific and was selected from EPA's RSL for Chemical Contaminants at Superfund Sites parameter database (May 2011). An average soil foc of 0.0415 (4.15%) was derived from the site-specific measurements of total organic carbon for the beach area. An average soil foc of 0.104 (10.4%) was derived from the site-specific measurements of total organic carbon for all other areas. The K_d of inorganic parameters is often pH dependent, particularly for metals. An average soil pH of 8.0 from site-specific measurements was used to select pH-dependent K_d values as provided in the SSL guidance document.
- **Total soil porosity** of 43% was used as a default factor from the EPA SSL guidance documents.
- **Water-filled soil porosity (θ_w)** or moisture content of 30% was used as a default factor from the EPA SSL guidance documents.
- **Air-filled soil porosity (θ_a)** was calculated at 13% as the difference between total porosity and moisture content.
- **Dimensionless Henry's Law coefficient (H')** is used to estimate the concentration in the air-filled porosity as provided in EPA's RSLs for Chemical Contaminants at Superfund Sites parameter database (May 2011).

1.3 Mass Limited SSL Calculations

SSL_{ML} values were calculated for all detected chemicals to indicate a lower limit to the SSL estimate. The use of mass limited SSLs is appropriate for the ECA because of the very thin soil zone. The mass limited SSL for migration to groundwater is calculated as follows:

$$SSL_{ML} = \left(\frac{C_w \times I \times ED}{\rho_b \times d_s}\right)\left(\frac{1}{12}\frac{ft}{in}\right)$$

Where:

SSL_{ML} = Mass Limited Soil Screening Level (mg/kg)
C_w = Target soil leachate concentration, see description above, (mg/L)
I = Infiltration rate (in/yr)
ED = Exposure duration (yrs)
= 70 yrs (EPA default)
ρ_b = Soil dry bulk density (kg/L)
= 1.5 kg/L (EPA default)
d_s = Thickness of the affected soil layer (ft)
= 12 inches as an average across the ECA

1.4 Estimating Soil Infiltration with the Soil Attenuation Model

The authors (Connor et. al., 1997) of the Soil Attenuation Model (SAM) developed empirical relationships for estimating net infiltration. Net infiltration is based on annual rainfall and the predominant soil type (sand, silt or clay). The algorithm for a silt-type soil was for the ECA because of the high content fine-grained organic material of the surficial soils. The estimate for annual rainfall was based on a long-term average 25.2 inches per year of rainfall.

The calculation follows:

$$I = 0.0009 \times P^2$$

Where:

I = net infiltration, cm/yr
P = average annual precipitation, cm/yr
= 25.2 in/yr
= 64.0 cm/yr

$$I = 0.0009 \times 64.0^2$$

$$= 3.69 \frac{cm}{yr}$$

$$= 1.45 \frac{in}{yr}$$

1.5 Applicability to the ECA

The calculated SSLs are found in Tables H-1a (ECA) and H-1b (ECA-Beach). The only mass limited SSLs are for perchlorate and selenium. The remainder of the SSLs were chosen based on the infinite source model. Tables H-1a and H-1b include some of the supporting parameters including: target leachate concentrations, groundwater protection standards, Henry's Law coefficient, soil-to-groundwater partition coefficient, and organic carbon-to-water partition coefficient. The soil input data is shown on Tables H-2a (ECA) and H-2b (ECA-Beach).

1.6 Uncertainties

SSLs are model generated values based on a number of assumptions including:

- Uniform distribution of contaminants across an affected area (i.e., the underlying assumption is that groundwater concentrations will be protective if all soil within a one-half acre affected area is at the SSL concentration). This is likely a gross overestimation of the contaminant mass within the one-half acre area

based on the analytical data collected at UXO 1. This has the effect of driving down the SSL value and, hence, overestimating the necessary protectiveness level.

- No degradation of the chemicals is included as the chemicals are transported through the vadose zone or by lateral transport in the groundwater bearing unit. This likely results in overestimating the necessary protectiveness level, especially with respect to organics, since degradation likely occurs.
- The leaching of chemicals from soil are dependent on chemical and site specific physical conditions. Leachate concentrations can either be over or underestimated.
- Dilution is based on quantitative estimates of the rate of infiltration and lateral groundwater flow. Lateral groundwater flow can be reasonably estimated from physical parameters evaluated from pumping tests. Infiltration is not readily measured and must be estimated from soil type and annual precipitation.

1.7 References

Conner, J. A.; R. L. Bowers, S. M. Paquette, and C. J. Newell (1997), *Soil Attenuation Model for Derivation of Risk-Based Soil Remediation Standards*. Groundwater Services, Inc., Houston, Texas (713) 522-6300. The Soil Attenuation Model was prepared as an update to Appendix X.2 in American Society for Testing and Materials (ASTM), 1995, "*Emergency Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*," ASTM E-1739, Philadelphia, PA.

EPA, 1996a. Soil Screening Guidance: User's Guide. USEPA, OSWER, Washington D.C. Publication 9355.4-23; *EPA540/R-96/018*

EPA, 1996b. Soil Screening Guidance Technical Background Document. EPA, OSWER, Washington D.C., Publication 9355.4-17A; *EPA/540/R-95/128*

EPA, 2002. Supplemental Guidance for Development of Soil Screening Levels for Superfund. USEPA, OSWER, Washington D.C., Publication OSWER 9355.4-24. December.

TABLE H1-A
ECA Calculated SSLs

Chemical Name	CAS No.	EPA Default SSL	SSL DAF = 10 [mg/kg]	Target Leachate Concentration DAF = 10 [mg/L]	EPA MCL [mg/L]	Tap Water RSL [mg/L]	Dimensionless Henry's Constant (H') [unitless]	Soil-Water Partitioning Coefficient (K_d) [cm3/g]	Soil-Organic Carbon Partitioning Coefficient (K_{oc}) [L/kg]	Comments
Explosives										
Dinitroaniline, 3,5-	99-65-0	0.0033	0.66	3.70E-02	NA	3.70E-03	6.17E-09	1.75E+01	1.7E+02	proxy = 1,3-dinitrobenzene for tap water criterion, chemical parameters from ORNL for 3,5-dinitroaniline
HMX, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra	2691-41-0	2.3	1,000	1.80E+01	NA	1.80E+00	3.54E-08	5.52E+01	5.3E+02	
Nitrobenzene	98-95-3	0.000079	0.028	1.20E-03	NA	1.20E-04	9.81E-04	2.35E+01	2.3E+02	
Tetryl (trinitrophenylmethylnitramine)	479-45-8	1.4	720	1.50E+00	NA	1.50E-01	1.11E-07	4.78E+02	4.6E+03	
Trinitrobenzene, 1,3,5-	99-35-4	3.9	1,900	1.10E+01	NA	1.10E+00	2.66E-07	1.75E+02	1.7E+03	
Trinitrotoluene, 2,4,6-	118-96-7	0.013	6.4	2.20E-02	NA	2.20E-03	8.50E-07	2.92E+02	2.8E+03	
Perchlorate and Perchlorate Salts	14797-73-0	NA	0.85	1.50E-01	1.50E-02	2.60E-02	NA	NA	NA	
Metals										
Aluminum	7429-90-5	55,000	1,000,000	3.70E+02	NA	3.70E+01	0.00E+00	3.53E+04	N/A	
Antimony	7440-36-0	0.27	2.7	6.00E-02	6.00E-03	1.50E-02	0.00E+00	4.50E+01	N/A	
Arsenic	7440-38-2	0.29	3.1	1.00E-01	1.00E-02	4.50E-05	0.00E+00	3.10E+01	N/A	
Barium	7440-39-3	82	1,000	2.00E+01	2.00E+00	7.30E+00	0.00E+00	5.20E+01	N/A	
Beryllium	7440-41-7	3.2	4,000	4.00E-02	4.00E-03	7.30E-02	0.00E+00	1.00E+05	N/A	
Cadmium	7440-43-9	0.38	220	5.00E-02	5.00E-03	1.80E-02	0.00E+00	4.30E+03	N/A	
Calcium	7440-70-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Chromium (III) (Insoluble Salts)	16065-83-1	99,000,000	1,000,000	5.50E+02	NA	5.50E+01	0.00E+00	4.30E+06	N/A	total Cr MCL
Chromium (hexavalent)	18540-29-9	2.1	0.0061	4.30E-04	NA	4.30E-05	0.00E+00	1.40E+01	N/A	EPA default SSL is based on the MCL, which is based on both Cr+3 and Cr+6
Cobalt	7440-48-4	0.49	5.0	1.10E-01	NA	1.10E-02	0.00E+00	4.50E+01	N/A	
Copper	7440-50-8	46	460	1.30E+01	1.30E+00	1.50E+00	0.00E+00	3.50E+01	N/A	
Cyanide	57-12-5	2.0	20	2.00E+00	2.00E-01	7.30E-01	0.00E+00	9.90E+00	N/A	
Iron	7439-89-6	640	6,600	2.60E+02	NA	2.60E+01	0.00E+00	2.50E+01	N/A	
Lead	7439-92-1	14	270	1.50E-01	1.50E-02	#VALUE!	0.00E+00	1.83E+03	N/A	
Magnesium	7439-95-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Manganese	7439-96-5	57	570	8.80E+00	NA	8.80E-01	0.00E+00	6.50E+01	N/A	
Mercury	7439-97-6	0.10	4.0	2.00E-02	2.00E-03	6.30E-04	4.67E-01	2.00E+02	N/A	
Nickel	7440-02-0	48	14,000	7.30E+00	NA	7.30E-01	0.00E+00	1.90E+03	N/A	
Potassium	7440-09-7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Selenium	7782-49-2	0.26	2.8	5.00E-01	5.00E-02	1.80E-01	0.00E+00	2.20E+00	N/A	
Silver	7440-22-4	1.6	200	1.80E+00	NA	1.80E-01	0.00E+00	1.10E+02	N/A	
Sodium	7440-23-5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Thallium	7440-28-0	0.14	1.9	2.00E-02	2.00E-03	3.70E-04	0.00E+00	9.60E+01	N/A	
Tin	7440-31-5	5,500	55,000	2.20E+02	NA	2.20E+01	0.00E+00	2.50E+02	N/A	
Vanadium	7440-62-2	180	1,800	1.80E+00	NA	1.80E-01	0.00E+00	1.00E+03	N/A	
Zinc	7440-66-6	680	58,000	1.10E+02	NA	1.10E+01	0.00E+00	5.30E+02	N/A	

Notes:
NA: not available
N/A: not applicable
MCL: maximum contaminant level
Tap Water values based on ELCR = 1E-06, or HI = 1.0

TABLE H1-B
ECA Beach SSLs

Chemical Name	CAS No.	EPA Default SSL	SSL DAF = 10 [mg/kg]	Target Leachate Concentration DAF = 10 [mg/L]	EPA MCL [mg/L]	Tap Water RSL [mg/L]	Dimensionless Henry's Constant (H') [unitless]	Soil-Water Partitioning Coefficient (K_d) [cm3/g]	Soil-Organic Carbon Partitioning Coefficient (K_{oc}) [L/kg]	Comments
Explosives										
Dinitroaniline, 3,5-	99-65-0	0.0033	**0.27**	3.70E-02	NA	3.70E-03	6.17E-09	7.01E+00	1.7E+02	proxy = 1,3-dinitrobenzene for tap water criterion, chemical parameters from ORNL
HMX, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra	2691-41-0	2.3	**400**	1.80E+01	NA	1.80E+00	3.54E-08	2.21E+01	5.3E+02	
Nitrobenzene	98-95-3	0.000079	**0.012**	1.20E-03	NA	1.20E-04	9.81E-04	9.40E+00	2.3E+02	
Tetryl (trinitrophenylmethylnitramine)	479-45-8	1.4	**290**	1.50E+00	NA	1.50E-01	1.11E-07	1.91E+02	4.6E+03	
Trinitrobenzene, 1,3,5-	99-35-4	3.9	**770**	1.10E+01	NA	1.10E+00	2.66E-07	6.98E+01	1.7E+03	
Trinitrotoluene, 2,4,6-	118-96-7	0.013	**2.6**	2.20E-02	NA	2.20E-03	8.50E-07	1.17E+02	2.8E+03	
Perchlorate and Perchlorate Salts	14797-73-0	NA	**0.85**	1.50E-01	1.50E-02	2.60E-02	NA	NA	NA	
Metals										
Aluminum	7429-90-5	55,000	**1,000,000**	3.70E+02	NA	3.70E+01	0.00E+00	3.53E+04	N/A	
Antimony	7440-36-0	0.27	**2.7**	6.00E-02	6.00E-03	1.50E-02	0.00E+00	4.50E+01	N/A	
Arsenic	7440-38-2	0.29	**3.1**	1.00E-01	1.00E-02	4.50E-05	0.00E+00	3.10E+01	N/A	
Barium	7440-39-3	82	**1,000**	2.00E+01	2.00E+00	7.30E+00	0.00E+00	5.20E+01	N/A	
Beryllium	7440-41-7	3.2	**4,000**	4.00E-02	4.00E-03	7.30E-02	0.00E+00	1.00E+05	N/A	
Cadmium	7440-43-9	0.38	**220**	5.00E-02	5.00E-03	1.80E-02	0.00E+00	4.30E+03	N/A	
Calcium	7440-70-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Chromium (III) (Insoluble Salts)	16065-83-1	99,000,000	**1,000,000**	5.50E+02	NA	5.50E+01	0.00E+00	4.30E+06	N/A	total Cr MCL
Chromium (hexavalent)	18540-29-9	2.1	**0.0061**	4.30E-04	NA	4.30E-05	0.00E+00	1.40E+01	N/A	EPA default SSL is based on the MCL, which is based on both Cr+3 and Cr+6
Cobalt	7440-48-4	0.49	**5.0**	1.10E-01	NA	1.10E-02	0.00E+00	4.50E+01	N/A	
Copper	7440-50-8	46	**460**	1.30E+01	1.30E+00	1.50E+00	0.00E+00	3.50E+01	N/A	
Cyanide	57-12-5	2.0	**20**	2.00E+00	2.00E-01	7.30E-01	0.00E+00	9.90E+00	N/A	
Iron	7439-89-6	640	**6,600**	2.60E+02	NA	2.60E+01	0.00E+00	2.50E+01	N/A	
Lead	7439-92-1	14	**270**	1.50E-01	1.50E-02	#VALUE!	0.00E+00	1.83E+03	N/A	
Magnesium	7439-95-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Manganese	7439-96-5	57	**570**	8.80E+00	NA	8.80E-01	0.00E+00	6.50E+01	N/A	
Mercury	7439-97-6	0.10	**4.0**	2.00E-02	2.00E-03	6.30E-04	4.67E-01	2.00E+02	N/A	
Nickel	7440-02-0	48	**14,000**	7.30E+00	NA	7.30E-01	0.00E+00	1.90E+03	N/A	
Potassium	7440-09-7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Selenium	7782-49-2	0.26	**2.8**	5.00E-01	5.00E-02	1.80E-01	0.00E+00	2.20E+00	N/A	
Silver	7440-22-4	1.6	**200**	1.80E+00	NA	1.80E-01	0.00E+00	1.10E+02	N/A	
Sodium	7440-23-5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Thallium	7440-28-0	0.14	**1.9**	2.00E-02	2.00E-03	3.70E-04	0.00E+00	9.60E+01	N/A	
Tin	7440-31-5	5,500	**55,000**	2.20E+02	NA	2.20E+01	0.00E+00	2.50E+02	N/A	
Vanadium	7440-62-2	180	**1,800**	1.80E+00	NA	1.80E-01	0.00E+00	1.00E+03	N/A	
Zinc	7440-66-6	680	**58,000**	1.10E+02	NA	1.10E+01	0.00E+00	5.30E+02	N/A	

Notes:
NA: not available
N/A: not applicable
MCL: maximum contaminant level
Tap Water values based on ELCR = 1E-06, or HI = 1.0

TABLE H2-A
ECA Soil Input Data

Soil Screening Level Partitioning Equation for Migration to Ground Water

Governing Equation:

$$SSL(mg/kg) = C_W\left[K_d + \frac{(\theta_W + \theta_a H')}{\rho_b}\right]$$

Mass Limit SSL:

$$SSL = \left(\frac{C_w \times I \times ED}{\rho_b \times d_s}\right)$$

where,

SSL	*soil screening level (mg/kg)*
C_W	*target soil leachate concentration, equal to the groundwater protection standard multiplied by the dilution factor (mg/L)*
K_d	*soil-water partition coefficient (L/kg)*
θ_W	*water-filled porosity (L_{water}/L_{soil})*
θ_a	*air-filled soil porosity (L_{air}/L_{soil})*
ρ_b	*dry soil bulk density (kg/L)*
n	*soil porosity (L_{pore}/L_{soil})*
ρ_s	*soil particle density (kg/L)*
H'	*dimensionless Henry's constant*

Variable	Value[b]	Definition	
f_{oc}	0.104	*fraction organic carbon in soil (g/g)*	Site specific average
θ_W	0.30	*water-filled porosity (L_{water}/L_{soil})*	
ρ_b	1.50	*dry soil bulk density (kg/L)*	
ρ_s	2.65	*soil particle density (kg/L)*	
n	0.43	*soil porosity (L_{pore}/L_{soil})*	
θ_a	0.13	*air-filled soil porosity (L_{air}/L_{soil})*	
pH	8.00	*soil pH*	Site specific average
d_s	12.00	*depth of source (in)*	
I	1.45	*Infiltration (in/yr)*	Calculated on DAF Calc tab

TABLE H2-A

ECA Soil Input Data

SITE SPECIFIC SOIL PH DATA	
VEECA-3SB03-0002-0211	7.7
VEECA-3SB04-001H-0211	7.7
VEECA-3SB01-0001-0211	7.9
VEECA-3SB02-0001-0211	7.9
VEECA-3SB05-0002-0211	7.9
VEECA-4SB01-001H-0211	8.1
VEECA-1SB01-1H02-0211	8.8
VEECA-4SS01-0001-0211	7.9
VEECA-1SB02-1H02-0211	NA
VEECA-1SB02P-1H02-0211	NA
VEECA-2SB01-0103-0211	NA
VEECA-2SB02-0103-0211	NA
VEECA-2SB02P-0103-0211	NA
VEECA-2SB03-0001-0211	NA
VEECA-2SB04-0507-0211	NA
VEECA-2SB05-0507-0211	NA
VEECA-2SB06-0507-0211	NA
VEECA-2SB07-0H2H-0211	NA
VEECA-2SB08-0204-0211	NA
VEECA-2SB09-4H6H-0211	NA
VEECA-2SB09P-4H6H-0211	NA
VEECA-2SB10-0204-0211	NA
VEECA-2SB11-7H9H-0211	NA
VEECA-2SB12-0H2H-0211	NA
VEECA-2SB13-000H-0211	NA
VEECA-2SB14-1H3H-0211	NA
VEECA-2SB15-0406-0211	NA
VEECA-3SB02P-0001-0211	NA

SITE SPECIFIC SOIL TOC DATA				
Lab Spl No.	UG/G	foc (G/G)	New Spl No	
ECA-1SS02-001-0611	29,000	0.029	VEECA-1SS02	Beach
ECA-1SS01-001-0611	54,000	0.054	VEECA-1SS01	Beach
ECA-2SS02-001-0611	52,000	0.052	VEECA-2SS02	Lowland
ECA-2SS01-001-0611	73,000	0.073	VEECA-2SS01	Lowland
ECA-4SS04-001-0611	140,000	0.140	VEECA-4SS04	Upland
ECA-4SS03-001-0611	180,000	0.180	VEECA-4SS03	Upland
ECA-4SS02-001-0611	74,000	0.074	VEECA-4SS02	Upland

TABLE H2-B
ECA Beach Soil Input Data

Soil Screening Level Partitioning Equation for Migration to Ground Water

Governing Equation:

$$SSL(mg/kg) = C_W\left[K_d + \frac{(\theta_W + \theta_a H')}{\rho_b}\right]$$

Mass Limit SSL:

$$SSL = \left(\frac{C_w \times I \times ED}{\rho_b \times d_s}\right)$$

where,

SSL	*soil screening level (mg/kg)*
C_W	*target soil leachate concentration, equal to the groundwater protection standard multiplied by the dilution factor (mg/L)*
K_d	*soil-water partition coefficient (L/kg)*
θ_W	*water-filled porosity (L_{water}/L_{soil})*
θ_a	*air-filled soil porosity (L_{air}/L_{soil})*
ρ_b	*dry soil bulk density (kg/L)*
n	*soil porosity (L_{pore}/L_{soil})*
ρ_s	*soil particle density (kg/L)*
H'	*dimensionless Henry's constant*

Variable	Value[b]	Definition	
f_{oc}	0.0415	*fraction organic carbon in soil (g/g)*	Site specific average
θ_W	0.30	*water-filled porosity (L_{water}/L_{soil})*	
ρ_b	1.50	*dry soil bulk density (kg/L)*	
ρ_s	2.65	*soil particle density (kg/L)*	
n	0.43	*soil porosity (L_{pore}/L_{soil})*	
θ_a	0.13	*air-filled soil porosity (L_{air}/L_{soil})*	
pH	8.00	*soil pH*	Site specific average
d_s	12.00	*depth of source (in)*	
I	1.45	*Infiltration (in/yr)*	Calculated on DAF Calc tab

TABLE H2-B
ECA Beach Soil Input Data

SITE SPECIFIC SOIL PH DATA	
VEECA-3SB03-0002-0211	7.7
VEECA-3SB04-001H-0211	7.7
VEECA-3SB01-0001-0211	7.9
VEECA-3SB02-0001-0211	7.9
VEECA-3SB05-0002-0211	7.9
VEECA-4SB01-001H-0211	8.1
VEECA-1SB01-1H02-0211	8.8
VEECA-4SS01-0001-0211	7.9
VEECA-1SB02-1H02-0211	NA
VEECA-1SB02P-1H02-0211	NA
VEECA-2SB01-0103-0211	NA
VEECA-2SB02-0103-0211	NA
VEECA-2SB02P-0103-0211	NA
VEECA-2SB03-0001-0211	NA
VEECA-2SB04-0507-0211	NA
VEECA-2SB05-0507-0211	NA
VEECA-2SB06-0507-0211	NA
VEECA-2SB07-0H2H-0211	NA
VEECA-2SB08-0204-0211	NA
VEECA-2SB09-4H6H-0211	NA
VEECA-2SB09P-4H6H-0211	NA
VEECA-2SB10-0204-0211	NA
VEECA-2SB11-7H9H-0211	NA
VEECA-2SB12-0H2H-0211	NA
VEECA-2SB13-000H-0211	NA
VEECA-2SB14-1H3H-0211	NA
VEECA-2SB15-0406-0211	NA
VEECA-3SB02P-0001-0211	NA

SITE SPECIFIC SOIL TOC DATA			
Lab Spl No.	UG/G	foc (G/G)	New Spl No
ECA-1SS02-001-0611	29,000	0.029	VEECA-1S Beach
ECA-1SS01-001-0611	54,000	0.054	VEECA-1S Beach
ECA-2SS02-001-0611	52,000	0.052	VEECA-2S Lowland
ECA-2SS01-001-0611	73,000	0.073	VEECA-2S Lowland
ECA-4SS04-001-0611	140,000	0.140	VEECA-4S Upland
ECA-4SS03-001-0611	180,000	0.180	VEECA-4S Upland
ECA-4SS02-001-0611	74,000	0.074	VEECA-4S Upland

Appendix I
Biological Assessment

Biological Assessment of the Former Live Impact Area within the Former Vieques Naval Training Range, Vieques, Puerto Rico

AMENDMENT I:

EASTERN CONSERVATION AREA

December 2007

prepared for:

CH2M Hill
5700 Cleveland Street, Suite 101
Virginia Beach, Virginia 23462

prepared by:

Geo-Marine, Inc.
2201 K Avenue, Suite A2
Plano, Texas 75074

Biological Assessment of the Former Live Impact Area within the Former Vieques Naval Training Range, Vieques, Puerto Rico

AMENDMENT I:

EASTERN CONSERVATION AREA

prepared for

CH2M Hill
5700 Cleveland Street, Suite 101
Virginia Beach, Virginia 23462

Under contract Number:
N62470-02-D-3052
P.O. Number 918238

prepared by

Geo-Marine, Inc.
2201 K Avenue, Suite A2
Plano, Texas 75074

December 2007

TABLE OF CONTENTS

Page

1.0 INTRODUCTION…… 1
2.0 SURVEY STRATEGY…… 1
2.1 SURVEY LOCATIONS…… 1
2.2 SURVEY METHODS…….. 2
3.0 RESULTS…… 2
4.0 CONSERVATION AND MITIGATION MEASURES…… 10
4.1 VEGETATION…… 10
4.2 BIRDS…… 10
5.0 DETERMINATION OF IMPACTS AND EFFECTS……... 10
5.1 VEGETATION…… 10
5.2 BIRDS…… 10
5.2.1 Brown Pelicans…….. 11

APPENDIX A Threatened and Endangered Birds and Plants of Puerto Rico……... 12
APPENDIX B Plant Species List……... 20
APPENDIX C Bird Species List…… 27

LIST OF FIGURES

Page

1 Map showing areas of high probability for the presence of *Stahlia monosperma* on Vieques, Puerto Rico……. 3

2 Map showing areas of high probability for the presence of *Goetzea elegans* and *Calyptranthes thomasiana* on Vieques, Puerto Rico……. 4

3 Map showing areas of high probability for the presence of *Chamaecrista glandulosa var. mirabilis* on Vieques, Puerto Rico……. 5

4 Map showing survey transects throughout the Eastern Conservation Area, Vieques, Puerto Rico……. 6

5 Map showing plant communities and topography within the Eastern Conservation Area, Vieques, Puerto Rico…….. 7

6 Map showing soil types and topography within the Eastern Conservation Area, Vieques, Puerto Rico……. 8

LIST OF TABLES

Page

1 Threatened and Endangered Bird and Plant Species that Occur or Potentially Occur on the island of Vieques, Puerto Rico……. 1

2 Plant Communities and Size within the Eastern Conservation Area……. 9

3 Soil Types and Description within the Eastern Conservation Area……. 9

1.0 INTRODUCTION

Geo-Marine (GMI) biologists conducted listed biological species (flora and fauna) and critical habitat surveys within the Eastern Conservation Area (ECA) on Vieques, Puerto Rico. The data obtained from these surveys are presented in this report and serve as an amendment to the May 2006 *Biological Assessment of the Former Live Impact Area within the Former Vieques Naval Training Range, Vieques, Puerto Rico* (LIA BA). This amendment will aid the U.S. Fish and Wildlife Service (UFWS) in determining whether munitions response actions (hereafter referred to as proposed action) within the ECA are likely to 1) adversely affect listed species; 2) jeopardize the continued existence of species that are proposed for listing; or 3) adversely modify proposed critical habitat. Additional background, regulation, historical use, and proposed action information for the former Vieques Naval Training Range (VNTR) are available in the May 2006 LIA BA.

2.0 SURVEY STRATEGY

The USFWS lists 10 threatened and endangered (T&E) bird and 49 T&E plant species as occurring or possibly occurring in Puerto Rico (**Appendix A**). The list was narrowed to four bird and five plant species for Vieques based on their specific habitat requirements and available habitat on the island (**Table 1**).

Table 1
Threatened and Endangered Bird and Plant Species that Occur or Potentially Occur on the island of Vieques, Puerto Rico.

Scientific Name	Common Name
Birds	
Agelauius xanthomus	Yellow-shouldered blackbird
Charadrius melodus	Piping plover
Sterna dougallii dougallii	Roseate tern
Pelecanus occidentalis	Brown pelican
Plants	
Calyptranthes thomasiana	Thomas' lidflower
Chamaecrista glandulosa var. mirabilis	Jamaican broom
Eugenia woodburyana	Woodbury's stopper
Goetzea elegans	Beautiful goetzea
Stahlia monosperma	Cobana negra

2.1 SURVEY LOCATIONS

To determine locations for surveys, extensive review of the ecological requirements for each T&E plant species was completed. This information, in conjunction with findings from previous surveys and existing vegetation, soil, and elevation data was mapped using ArcGIS to determine where the specific required parameters for each species overlap.

Polygons or shapefiles were then created for areas of overlap to indicate locations of high probability for the existence of each T&E species (**Figures 1-3**). One species that is thought to potentially occur on Vieques, *Eugenia woodburyana,* could not be "matched" to any habitat areas based on previous surveys or its elevation, soil, and associated vegetation requirements.

Only a small area (~ 1 acre) within the ECA was shown to be an area of high probability for T&E plant species based on the existing data and their ecological requirements. However, few surveys have been conducted within the ECA and only limited information is available regarding the species composition and habitats of the area. Therefore, to ensure surveys for critical habitats and T&E flora and fauna were adequate; the entire 120 acres of the ECA were surveyed. The small islands off the coast of the ECA were not included in these surveys.

2.2 SURVEY METHODS

Field surveys were conducted from 30 January 2007 through 15 February 2007 by qualified biologists via north-south parallel transects. The transects ran the entire width of the area and were spaced approximately 100 feet apart and biologists surveyed all vegetation 25 feet on either side of the transect centerline (**Figure 4**). In areas where vegetation was exceptionally dense, plants were surveyed to the degree possible. Compasses were used to maintain heading, however, deviations from the centerline were necessary in areas of rough terrain, dense vegetation, or ordnance. Biologists also walked both roads in the ECA surveying all vegetation 25 feet north and south of the road.

During vegetation surveys, biologists also observed the area for T&E and neotropical birds species. Dense vegetation and noise created by surveyors moving through the brush made observations difficult, however, several species of birds were observed when flying over the area. GPS points were not taken for these observations because the distance between the biologists and the observed birds was too far to show accurate locations.

3.0 RESULTS

A total of 155 plant species from 55 different families were observed during the ECA surveys, none of which are listed as threatened, endangered, or rare species (**Appendix B**). However, four species not previously documented from the island of Vieques were observed during these surveys; *Caesalpinia culebrae (*Mato de Culebra)*, Colubrina elliptica (*Catire)*, Ziziphus reticulata (*Azufaifo)*, and Zanthoxylum flavum* (Aceitillo).

The ECA is characterized primarily by rough terrain from limestone and dolomite outcroppings. Vegetation ranges from low-growing, dense vegetation along the eastern edge to forested areas along the west and northwest portions of the area. A large lagoon surrounded by mangroves is also present in the northwestern portion of the ECA. This lagoon has no tidal connections and is only flooded during rain events.

Six distinct vegetation communities are found throughout the ECA (**Figure 5**). These communities were mapped in November 1999 using true color aerial photography, and **Table 2** provides each community's coverage in acres. Soils in the ECA are shallow, fine-grained, and have high clay content and classified as either rocky land or coastal beaches (**Table 3**; **Figure 6**). Although several distinct and productive habitats were seen during these surveys, no areas of designated critical habitat were observed.

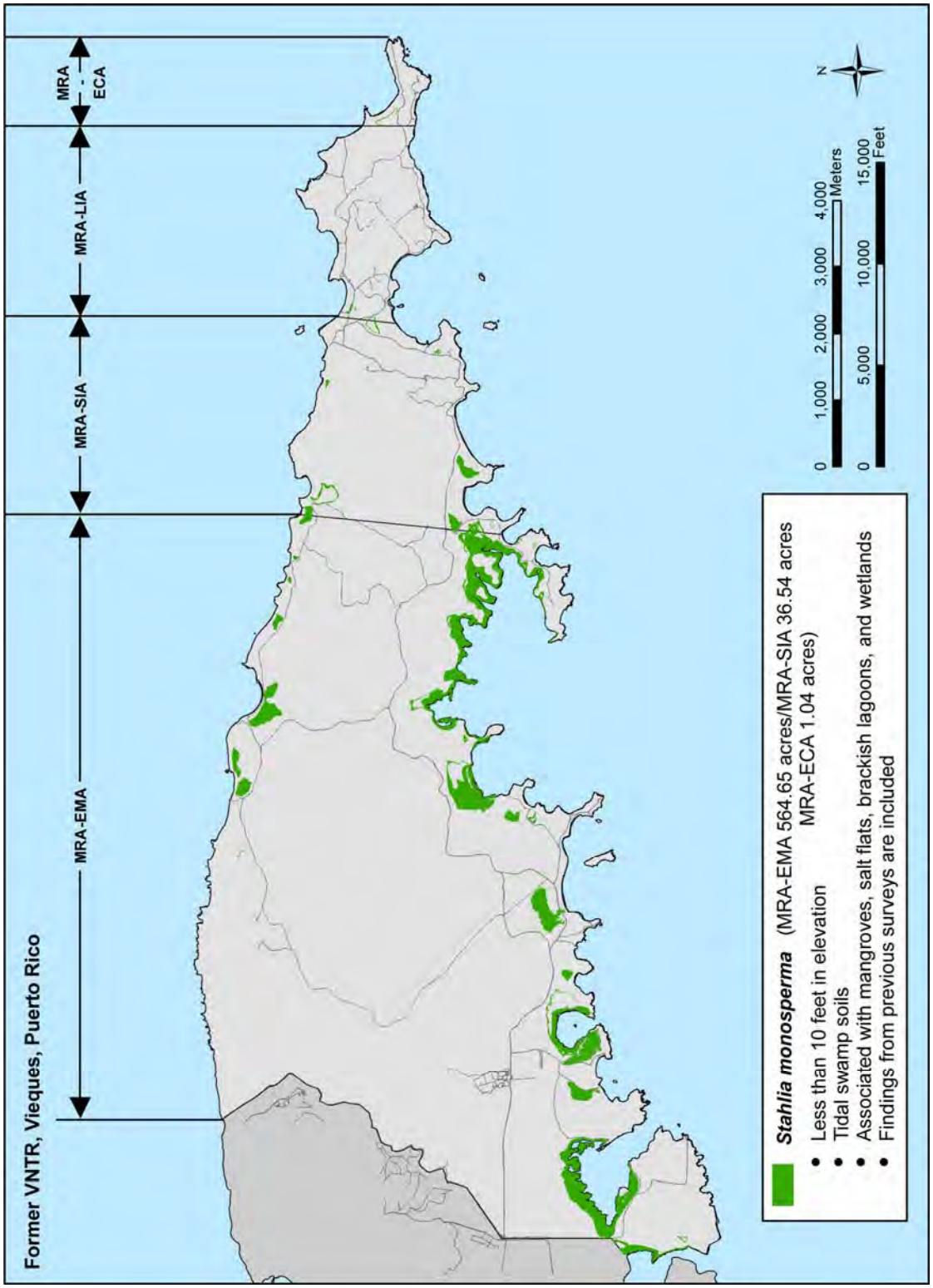


Figure 1. Map showing areas of high probability for the presence of *Stahlia monosperma* on Vieques, Puerto Rico.

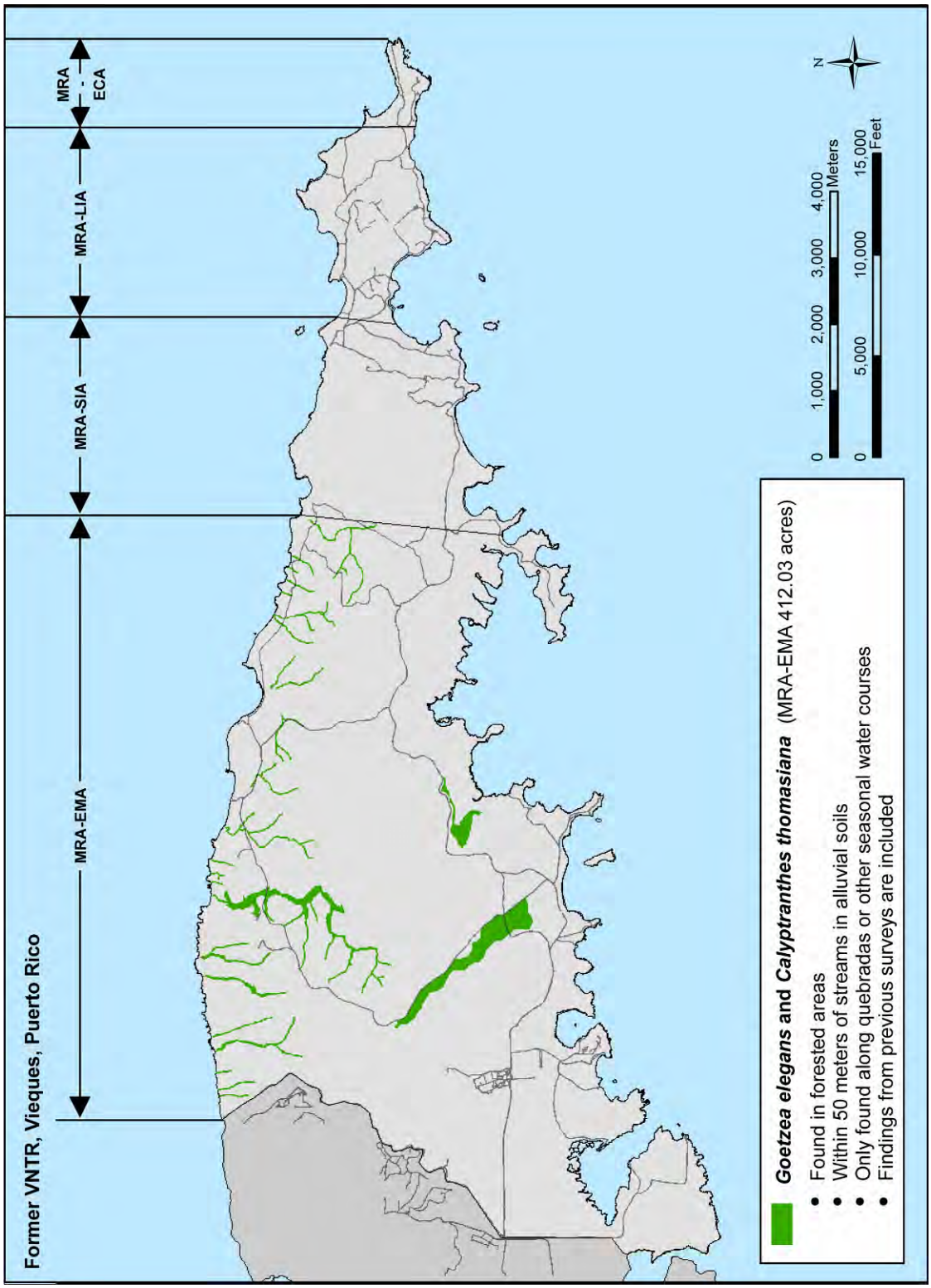


Figure 2. Map showing areas of high probability for the presence of *Goetzea elegans* and *Calyptranthes thomasiana* on Vieques, Puerto Rico.

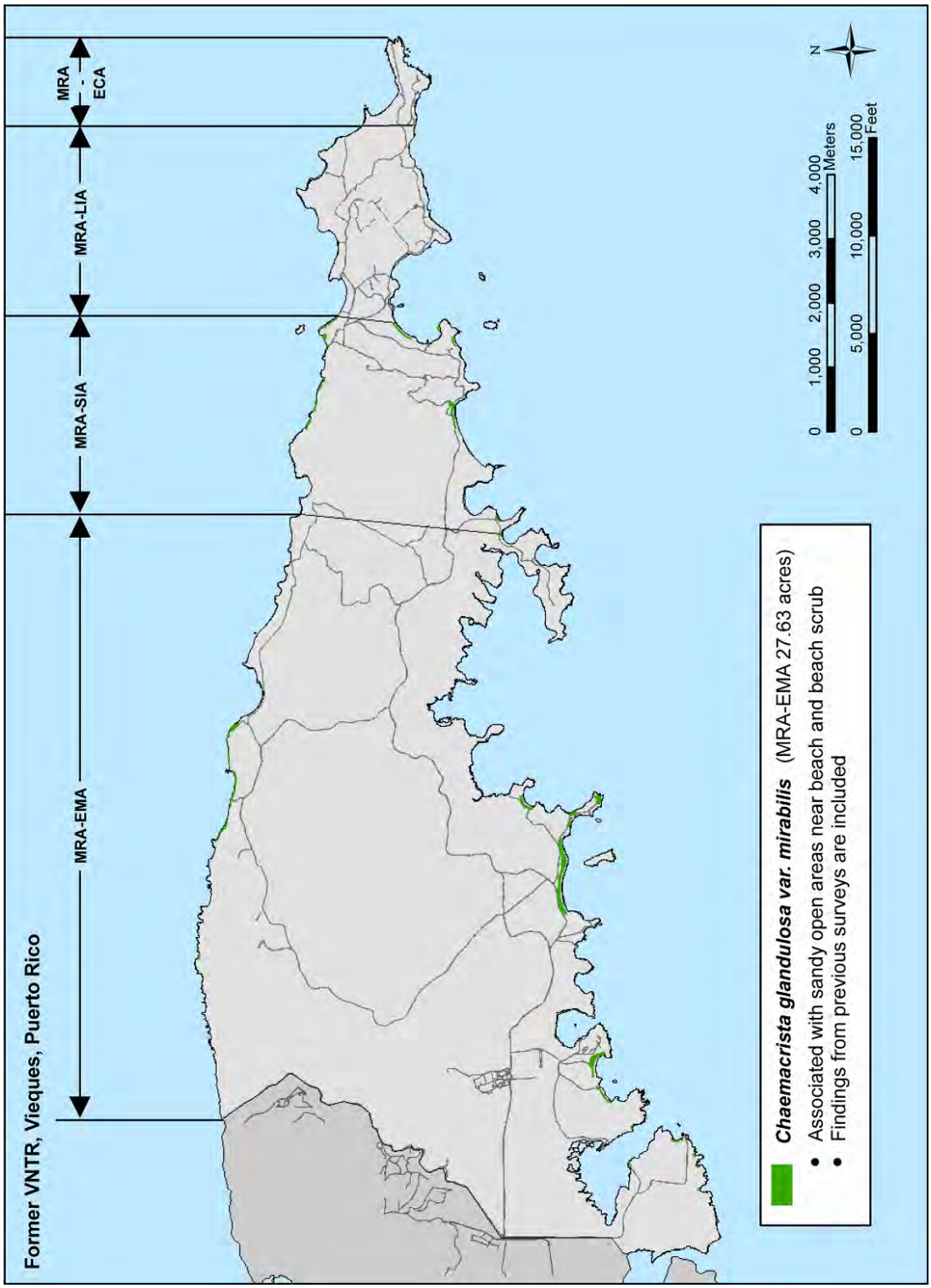


Figure 3. Map showing areas of high probability for the presence of *Chaemacrista glandulosa var. mirabilis* on Vieques, Puerto Rico.

Figure 4. Map showing survey transects throughout the Eastern Conservation Area, Vieques, Puerto Rico.

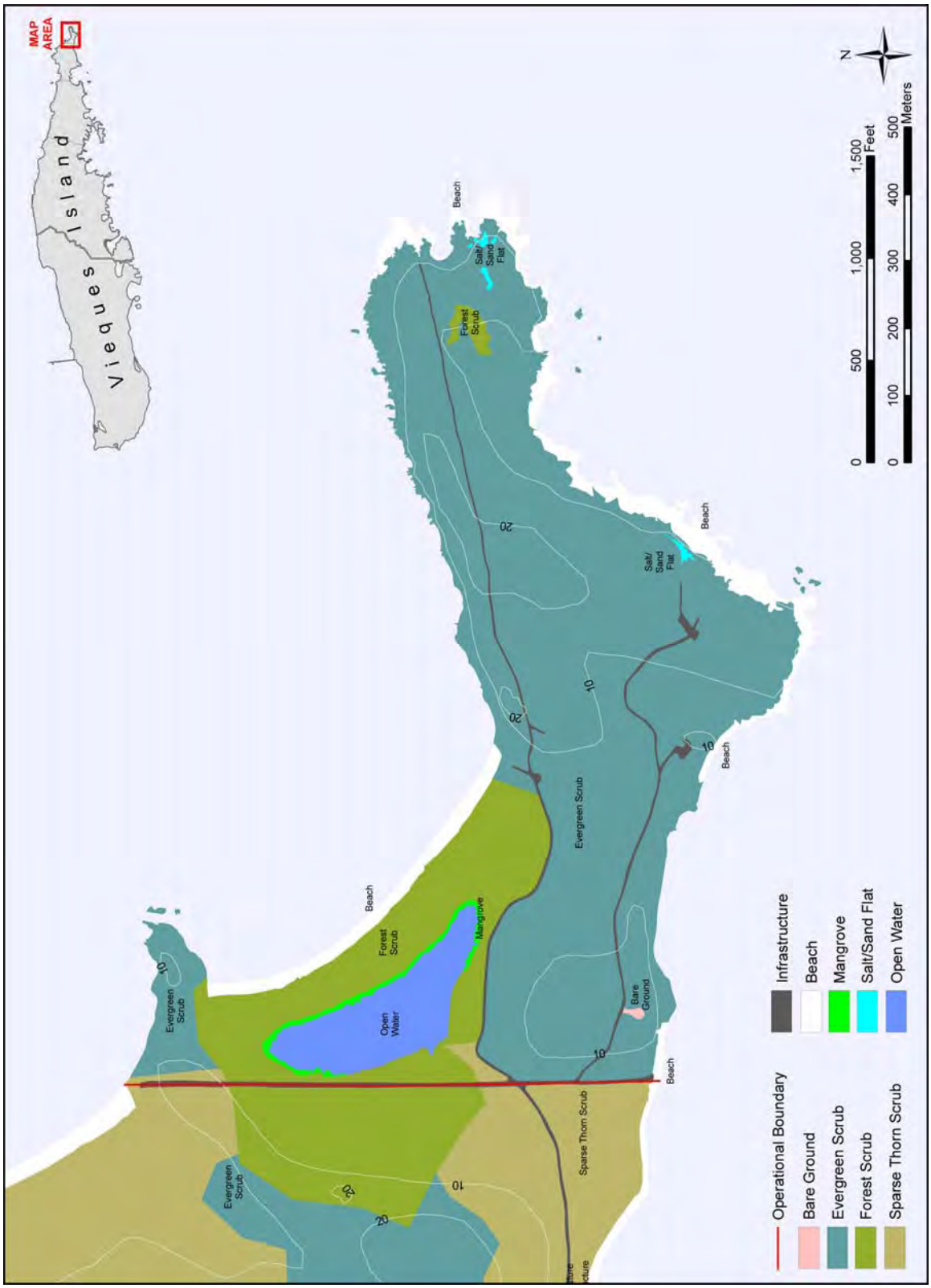


Figure 5. Map showing plant communities and topography within the Eastern Conservation Area, Vieques, Puerto Rico.

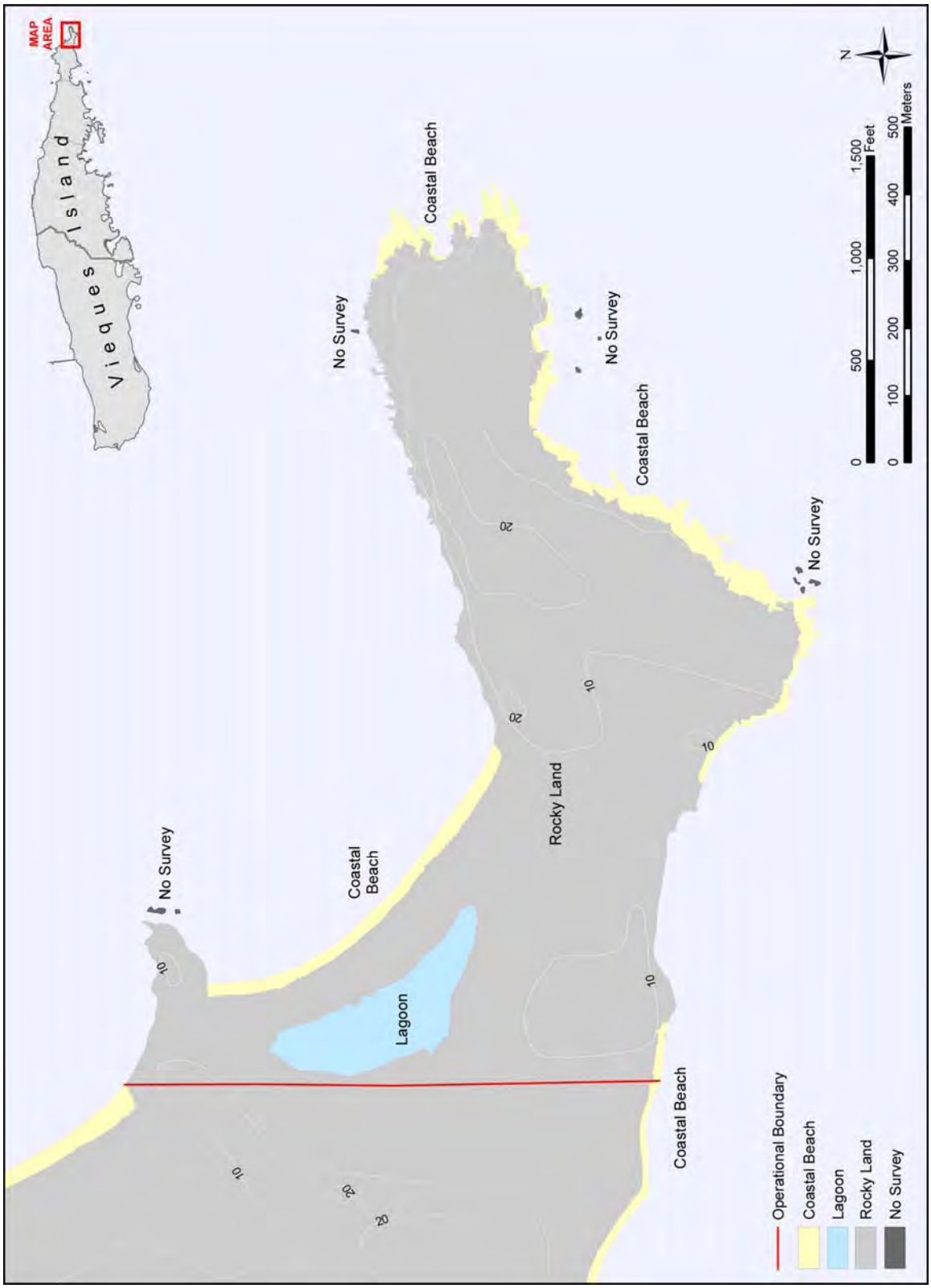


Figure 6. Map showing soil types and topography within the Eastern Conservation Area, Vieques, Puerto Rico.

Table 2
Plant Communities and Size within the Eastern Conservation Area

Plant community	Size (ac)
Evergreen scrub	89.9
Forest scrub	18.9
Sparse thorn scrub	0.1
Mangrove	1.0
Salt/sand flat	0.2
Beach	9.5
Bare ground	0.1

Table 3
Soil Types and Description within the Eastern Conservation Area

	Size (ac)	Description
Rocky Land	113.7	Consists of areas where rock crops out on 50 to 70% of the surface. Loose stones are common on the surface, and very shallow soil material lies between the outcrops and stones. This soil type has very little value for farming or engineering uses and is restricted mainly to wildlife use.
Coastal Beaches	9.5	Consists of narrow strips of light-colored beach sand that is saturated with seawater and contains many seashells and shell fragments. This land has no value for farming and most of it is devoid of vegetation, except for halophytic vegetation.

Brown pelicans were observed daily feeding and/or resting at the west end of Playa Blanca, either on the beach, in the water, or on the exposed coral outcrops. Ten birds were observed the first day, and three to five birds were observed each day after. Brown pelicans were the only T&E bird species observed in the area. Twenty other species, including shorebirds, residents, and migrants, were observed flying over the area during the vegetation surveys. A complete list of all species documented is available in **Appendix C**.

Roseate terns are known to occur and/or nest on the beaches of the ECA. No terns were observed during these surveys as they only occur in the area from approximately May to October. Surveys should be conducted during their nesting season (May to August) to accurately assess their use of the ECA.

No snakes, amphibians, or other T&E species of any kind were observed in the ECA during the January 30 – February 15, 2007 surveys. A separate amendment will be developed for sea turtle surveys, nesting, and zone restritions.

4.0 CONSERVATION OR MITIGATION MEASURES

The proposed action in the VNTR is accomplished through two sub-actions, vegetation removal and ordnance detonation. Impacts to listed species could potentially occur as a result of these sub-actions, therefore, the following measures should be implemented to prevent, minimize, or otherwise mitigate adverse affects.

4.1 VEGETATION

It is unlikely that any of the listed plant species occur within the ECA as the area does not provide the necessary ecological requirements to support these species. Therefore, the implementation of the proposed action is not likely to adversely affect the threatened, endangered, or rare plant species that occur or potentially occur on Vieques.

4.2 BIRDS

The following measures should be implemented to prevent, minimize, or otherwise mitigate potential adverse impacts to brown pelicans. Additional surveys are necessary to determine other areas or species of concern.

- If ordnance is to be detonated within 70 m of the ECA lagoon or Playa Blanca, a biologists should check both locations with 10 x 50 binoculars for brown pelicans. If the species is present in or flying over either location, the detonation should be delayed until the individuals leave the area.
- Prior to detonation, a biologists near the detonation site should scan the entire sky for birds in flight. If birds are inflight within a 100 m radius of the detonation site, the detonation should be delayed. Dentonation will proceed when no birds are observed in the 100 m radius of the site.

5.0 DETERMINATION OF IMPACTS AND EFFECTS

5.1 VEGETATION

Direct short-term impacts to listed plants, if present, from vegetation removal and ordnance detonation associated with the proposed action would potentially involve destruction of the individual plant(s). Indirect impacts would involve distrubace to soil profiles, potential soil compaction, and soil erosion due to removed vegetative cover.

As stated in Section 4.1, the T&E plant species of concern for this BA most likely do not occur within the ECA. Therefore, there is little probablility that the proposed action would impact these species.

5.2 BIRDS

Direct short-term impacts from the proposed action to listed bird species, if present, include displacement, destruction of nests (eggs, nestlings, juveniles incapable of flight), and loss of habitat from vegetation removal and ordnance detonation. Additionally, birds in flight over detonations could potentialy be struck by debris which may take or injure individual animals. Indirect short-term impacts from the proposed action include disturbances related to noise from detonated ordnance and loss of nesting and feeding habitat.

5.2.1 Brown Pelicans

Vegetation removal or ordnance detonation that would result in loss of vegetation associated with the proposed action would have no effect on brown pelicans since the species does not nest within the ECA or obtain food from terrestrial sources.

The subsequent noise from ordnance detonation may cause disturbances to brown pelican that are feeding or resting along Playa Blanca, however, studies were conducted in 2000 and 2001 to determine the behavior responses of brown pelicans to naval training excercises. Little to no disturbance was documented during the study, suggesting that brown pelicans are not effected by the noise (see Appendices D and E of the May 2006 LIA BA for full study details).

Although unlikely, the potential exists for debris from ordnance detonation to strike and injure or take brown pelicans flying over the detonation site. Based on the surveys discussed in this report, the area for highest potential of ordnance debris to effect brown pelicans is near Playa Blanca. However, these birds were observed to fly to Playa Blanca from the south, creating areas of concern along the west and southwest portions of the ECA. Conservation measures that would be conducted prior to detonation would greatly reduce the possibility of ordnance debris striking a brown pelican in flight. Therefore, the proposed action is not likely to adversely impact brown pelicans.

APPENDIX A
Threatened and Endangered Birds and Plants of Puerto Rico

U.S. Fish and Wildlife Service's list of threatened and endangered bird and plant species occurring or potentially occurring on Puerto Rico as of January 2007.

Species	Status	Range & Habitat	Found on Vieques
BIRDS			
Agelaius xanthomus (yellow-shouldered blackbird)	E	▪ mangrove zone or the arid coastal fringe. Nesting occurs in mangroves along the coast and on small off-shore islands	Possible
Buteo platypterus brunnescens (Puerto Rican broad-winged hawk)	E	▪ more often seen in the eastern side of the Caribbean National Forest, and the tabonuco and palo colorado forest types were reported to be the preferred habitats for the species (Wiley and Bauer 1985). Delannoy (1992) reported broad-winged hawks clustered in the north-central part of the Caribbean National Forest within the subtropical wet forest and subtropical rain forest life zones, where the tabonuco is the dominant forest type. In the Carite forest the species has been reported from the elfin, caimitillo, granadillo, tabonuco, and slope forest types (Hern ndez 1980, Delannoy 1992).	NO
Accipiter striatus venator (Puerto Rican sharp-shinned hawk)	E	▪ located in the north-central and eastern parts of the Maricao forest, within the subtropical lower montane wet forest and subtropical wet forest life zones	NO
Caprimulgus noctitherus (Puerto Rican night jar)	E	▪ presently found only in the dry limestone forests of the southwestern coast. In the Susua area nightjars occur primarily on the southern slopes, but could be found in the mature lower cordillera forest at somewhat higher elevations. In the Gu nica Forest, where the nightjars are most common, elevations range from sea level to 23O meters.	NO
Amazona vittata (Puerto Rican parrot)	E	▪ Puerto Rican parrot is presently found only in Puerto Rico, but up until 1899 it was also found on nearby Culebra Island, and earlier on Vieques and Mona Islands. ▪ The present habitat consists of mature rain forest located between about 1,3OO and 2,7OO feet in elevation.	Possible
Columba inornata wetmorei (Puerto Rican plain pigeon)	E	▪ The plain pigeon historically was widespread in the western foothills and valleys of Puerto Rico ▪ General habitat types used in the past include lowland swamps and woodland, open woodland and cultivated land in the mountains, limestone karst, and coffee plantations in upland hills. The presently occupied habitat is located in the lower montane rainforest zone.	NO

Species	Status	Range & Habitat	Found on Vieques
Charadrius melodus (piping plover)	T	▪ populations inhabit beaches, mudflats, and sandflats	YES
Sterna dougallii dougallii (roseate tern)	T	▪ Roseate terns breed in colonies almost exclusively on small offshore islands, rarely on large islands. The northeastern colonies are on rocky offshore islands, barrier beaches, or salt marsh islands. Most colonies are close to shallow water fishing sites with sandy bottoms, bars, or shoals. The Caribbean birds nest in relatively open areas, often with no cover nearby. They breed on a variety of small cays or islands with rocky, grassy, coral rubble, or sand substrate. There is little information on the habitat of the wintering range. Some birds have been found roosting on sandbars or beaches at river mouths, estuaries, or ocean front.	YES
Corvus leucognaphalus (white-necked crow)	T	▪ Does not occur in Puerto Rico or vicinity	NO
Pelecanus occidentalis (brown pelican)	E	▪ Habitat of the brown pelican is mainly coastal; these birds are rarely seen inland or far out at sea. They feed mostly in shallow estuarine waters, less often up to 40 miles from shore. Pelicans make extensive use of sand spits, offshore sand bars, and islets for nocturnal roosting and daily loafing, especially by nonbreeders and during the non-nesting season. Dry roosting sites are essential. Some roosting sites eventually may become nesting areas.	YES
PLANTS			
Adiantum vivesii (Puerto Rico maidenhair)	E	▪ found only on privately owned land located on the norths side of Puerto Rico Hwy ▪ found in the limestone or karst region up to 198 m in elevation	NO
Aristida chaseae (Chase's threeawn)	E	▪ endemic to Puerto Rico and currently known from only two sites in the southwestern portion of the island ▪ located within the subtropical dry forest life zone	Possible
Aristida portoricensis (pelos del Diablo)	E	▪ Pelos del diablo is found on serpentine slopes and red clay soils of southwestern Puerto Rico. In the Sierra Bermeja this grass is found growing on exposed rock crevices, frequently in association with Aristida chasae, a candidate species, and Digitaria eggersii, at elevations between 180 and 301 meters.	NO

Species	Status	Range & Habitat	Found on Vieques
Auerodendron pauciflorum (turtlefat)	E	▪ only known to exist in the limestone hills of Isabela in northwestern Puerto Rico ▪ restricted to semi-evergreen forests	NO
Banara vanderbiltii (Vanderbilt's palo de ramon)	E	▪ plant is currently known from two privately-owned sites: in northern Puerto Rico, between Vega Baja and Bayamon, and in the Tetas de Cayey in the municipality of Salinas ▪ found in the semi-evergreen forests of the karst region of northern Puerto Rico and in one area in the central mountains	NO
Buxus vahlii (Vahl's box)	E	▪ This plant is known from two locations in Puerto Rico ▪ Vahl's boxwood is found in semi-evergreen seasonal forests on limestone at elevations between 8O and 65O feet, where it is restricted to ravines and ledges. It grows as an understory shrub in semi-shaded conditions.	Possible
Callicarpa ampla (caparosa)	E	▪ At present capa rosa is known only from the palo colorado forest of the Luquillo Mountains in northeastern Puerto Rico. All known sites occur within the Caribbean National Forest, managed by the U.S. Forest Service. The palo colorado forest is found at elevations greater than 65O meters.	NO
Calyptranthes thomasiana (Thomas' lidflower)	E	▪ 300 – 800 feet in elevation in upland moist forest or semi-evergreen forests	Possible
Calyptronoma rivalis (Puerto Rico manac)	T	▪ located in the semi-evergreen, limestone forests of northwestern Puerto Rico. These forests are at elevations of 1OO to 15O meters. The habitat areas are wet and humid, and the natural populations are found in level or almost level areas around stream banks.	Possible
Catesbaea melanocarpa (tropical lilythorn)	E	▪ subtropical dry forest of southwest PR	NO
Chamaecrista glandulosa var. mirabilis (Jamaican broom)	E	▪ endemic to the silica sands of the northern coast of Puerto Rico ▪ previously found associated with mangroves in the southwest portion of former navy lands, Vieques	YES
Cordia bellonis (serpentine manjack)	E	▪ elevation 441 to 820 meters along river margins and on steep slopes	NO
Cornutia obovata (nigua)	E	▪ Only seven trees are known to exist in three areas: five individuals from five different locations in the limestone hills of the R¡o Abajo Commonwealth Forest; one from the limestone hills near the Arecibo Observatory; and one from Barranquitas	Possible

Species	Status	Range & Habitat	Found on Vieques
		in the central mountains ▪ found in the semi-evergreen or evergreen seasonal forest of the subtropical moist forest life zone on limestone hills at elevations from 15O to 35O meters.	
Cranichis ricartii (Puerto Rico helmet orchid)	E	▪ reported from three locations in the moist serpentine scrub forests of the Maricao Commonwealth Forest ▪ found growing in the humus of moist serpentine scrub forests of montane ridges at elevations above 680 meters.	NO
Crescentia portoricensis (higuero de sierra)	E	▪ found on only 12 sites in two areas of southwestern Puerto Rico ▪ inhabits montane, lower montane, mixed evergreen, semievergreen, and deciduous forests, which are underlain by serpentine. Within the two forests where it occurs, the species is restricted to sites along permanent or intermittent watercourses.	NO
Cyathea dryopteroides (forest alsophila)	E	▪ endemic to elfin forests of the Central Cordillera of Puerto Rico at elevations above 1,000 meters (3,280 feet).	NO
Daphnopsis hellerana (no common name)	E	▪ endemic to Puerto Rico and restricted to the limestone hills of the northwestern coast of the island. ▪ found in the semi-evergreen or evergreen seasonal forest of the subtropical moist forest life zone on limestone hills at elevations from 15O to 35O meters.	Possible
Elaphoglossum serpens (cerro de punta jayuya)	E	▪ found at a single site in the montane dwarf forest of the summit of Cerro Punta	NO
Eugenia haematocarpa (Luquillo Mountain stopper)	E	▪ occurs within the Caribbean National Forest within the palo colorado forest ▪ found at elevations greater than 650 meters	NO
Eugenia woodburyana (Woodbury's stopper)	E	▪ currently known only from the Sierra Bermeja in the municipalities of Cabo Rojo and Lajas and from the Gunica Commonwealth Forest in Gunica, all in southwestern Puerto Rico. ▪ subtropical dry forest life zone	Possible
Gesneria pauciflora (yerba maricao de cueva)	T	▪ found growing in rocky stream beds on wet serpentine rock, where water is constantly seeping	Possible
Goetzea elegans (Beautiful goetzea)	E	▪ Forested area, within 50m of streams in alluvial soils ▪ Along quebradas or seasonal water courses	YES
Harrisia portoricensis (Puerto Rico applecactus)	T	▪ Once occurring on mainland Puerto Rico, the species has not been collected there	NO

Species	Status	Range & Habitat	Found on Vieques
		since 1913, and is considered extirpated. The plant currently is restricted to three islands west of Puerto Rico Mona, Monito, and Desecheo.	
Ilex cookii (no common name)	E	▪ endemic to elfin forests of the Central Cordillera of Puerto Rico at elevations above 1,000 meters (3,280 feet).	NO
Ilex sintenisii (Sintenis' holly)	E	▪ found only in the Luquillo Mountains where it is restricted to the dwarf or elfin forest. ▪ found at elevations above 75O meters on windward, ridge and leeward areas of the mountain tops	NO
Juglans jamaicensis (West Indian walnut)	E	▪ found on lands adjacent to the Monte Guilarte Commonwealth Forest in the central mountains of Puerto Rico	NO
Lepanthes eltoroensis	E	▪ found only in the sierra Palm, palo colorado, and dwarf forest associations of the Luquillo Mountains, all at elevations greater than 850 meters.	NO
Leptocereus grantianus (Luquillo Mountain babyboot orchid)	E	▪ endemic to the island of Culebra which is located just off the northeastern corner of Puerto Rico. ▪ subtropical dry forest life zone.	Possible
Lyonia truncata var. proctorii (Proctor's staggerbush)	E	▪ very steep slopes of Cerro Mariquita in the range of hills known as the Sierra Bermeja	NO
Mitracarpus maxwelliae (Maxwell's girdlepod)	E	▪ known from only one location in the municipality of Guánica, in the southwestern part of the island ▪ subtropical dry forest life zone	NO
Mitracarpus polycladus (cana gorda girdlepod)	E	▪ known from the island of Saba in the Lesser Antilles and from one locality in southwestern Puerto Rico ▪ within the subtropical dry forest life zone	NO
Myrcia paganii (ausu)	E	▪ found in the semi-evergreen or evergreen seasonal forest of the subtropical moist forest life zone on limestone hills at elevations from 150 to 350 meters	Possible
Ottoschulzia rhodoxylon (pincho palo de rosa)	E	▪ Found in three locations ▪ Different types of habitat exist at each of the three locations. The north coast, Bayamon site is situated in a semi-evergreen, seasonal forest at an elevation of 325 feet or 1OO meters. In the southwestern coast Guanica Forest, the species occurs in a low elevation, semi-deciduous, dry forest on limestone. One tree in this population is located alongside a dry stream bed which carries water only during torrential rains. The individual in the Maricao Forest survives in a lower montane, semi-evergreen forest on	Possible

Species	Status	Range & Habitat	Found on Vieques
		serpentine outcrops. This location is at an elevation of about 1,96O feet or 6OO meters.	
Peperomia wheeleri (Wheeler's peperomia)	E	▪ Wheeler's peperomia is only known from Culebra ▪ Andesitic lava underlies most of Culebra Island, and on the north coast it is overlain by andesitic tuff. In north central Culebra this tuff and lava has been intruded by diorite. This diorite has weathered to round boulders which may reach several feet in diameter. Between these boulders the soil is shallow and mixed with loose stones.	NO
Pleodendron macranthum (chupa gallo)	E	▪ subtropical wet and the subtropical montane wet forests of northern and eastern Puerto Rico ▪ elevations greater than 650 meters	NO
Polystichum calderonense (Monte Guilarte hollyfern)	E	▪ found on moist, shaded, non-calcareous ledges on mountain tops at elevations of 1,000 to 1150 meters	NO
Schoepfia arenaria (arena)	T	▪ known from four locations: Isabela, Piñones, Fajardo, and Río Abajo Commonwealth Forest ▪ found in low elevation evergreen and semi-evergreen forests of the limestone hills of northern Puerto Rico at elevations which vary from 150 to 350 meters	Possible
Solanum drymophilum (Bahama nightshade)	E	▪ Only 1OO to 15O plants still exist on a single, 2-acre site in the Sierra de Cayey in central Puerto Rico. ▪ Although Erubia is native to evergreen forests on volcanic soils from 1,OOO to 3,OOO feet, most of the shrub's remaining population is in a pasture on the area's southern hill.	NO
Stahlia monosperma (Coban negra)	T	▪ Scattered populations survive in Puerto Rico, the island of Vieques, and in the eastern portion of the Dominican Republic. ▪ Cobana Negra is found on the edge of salt flats in brackish, seasonally flooded wetlands. Its associates are black mangrove and buttonwood mangrove.	YES
Styrax portoricensis (palo de jazmin)	E	▪ only one immature tree is presently known and occurs in the palo colorado forest ▪ the palo colorado forest is found at elevations greater than 65O meters	NO
Tectaria estremerana (no common name)	E	▪ found in moist, shaded humus on and among the limestone boulders at 250 to 300 meters	NO

Species	Status	Range & Habitat	Found on Vieques
Ternstroemia luquillensis (palo Colorado)	E	▪ known only from the palo colorado and dwarf forests of the Luquillo Mountains in northeastern Puerto Rico	NO
Ternstroemia subsessilis (el yunque Colorado)	E	▪ restricted to the palo colorado and dwarf forests of the Luquillo Mountains	NO
Thelypteris inabonensis (cordillera maiden fern)	E	▪ is rare and localized in wet, montane forests at elevations of 1,120 to 1,250 meters	NO
Thelypteris verecunda (Barrio Charcas maiden fern)	E	▪ is found at moist shaded limestone ledges at middle elevations of 200 meters	NO
Thelypteris yaucoensis (Puerto Rico maiden fern)	E	▪ found in humus on steep, shaded rocky banks and ledges at high elevations of 850 to 1,200 meters.	NO
Trichilia triacantha (bariaco)	E	▪ Bariaco is endemic to Puerto Rico and is restricted to dry limestone forests of the southwestern portion of the island. ▪ Bariaco is found in the deciduous and the semi-evergreen seasonal forests of the subtropical dry forest life zone of southwestern Puerto Rico at elevations of less than 100 meters.	NO
Vernonia proctorii (no common name)	E	▪ endemic to Puerto Rico and known only from the summit area of Cerro Mariquita in the range of hills known as the Sierra Bermeja ▪ located within the subtropical dry forest life zone	NO
Zanthoxylum thomasianum (St. Thomas pricklyash)	E	▪ The species grows in rugged hilly areas in soils of volcanic origin, as well as in areas of limestone. These areas are distinguished by the low stature of the vegetation and by having more than 50 percent of the species losing their leaves during the dry season. Two strata of trees are usually present. The uppermost continuous stratum is located about 15 to 30 feet high and is mostly composed of deciduous species. The lower stratum, at or below 15 feet, is composed of evergreen species. An herbaceous layer is lacking for the most part.	Possible

APPENDIX B
Plant Species List

LIST OF ALL PLANT SPECIES OBSERVED IN THE EASTERN CONSERVATION AREA, VIEQUES, PUERTO RICO
30 Jan 07– 15 Feb 07

*New records for Vieques in bold

These species are not included in G. R. Proctor's list of 1994 published by the *Department of Natural and Environmental Resources*), and in G. Breckon's *List of Plants from Vieques Island* (unpublished).

Family	Species	Common Name(s)
ACANTHACEAE		
	Oplonia spinosa (Jacq.) Raf.	Espinosa; Prickly bush
AIZOACEAE		
	Sesuvium portulacastrum (L.) L.	Verdolaga rosada; Sea purslane
AMARANTHACEAE		
	Celosia nitida Vahl	none
ANACARDIACEAE		
	Comocladia dodonaea (L.) Urban	Chicharrón; Cock´s spur
APOCYNACEAE		
	Echites agglutinatus Jacq.	Bejuco lechoso
	Pentalinon luteum (L.) Hansen & Wunderlin	Babeiro amarillo
	Plumeria alba L.	Alhelí; Milk tree
	Rauvolfia nitida Jacq.	Cachimbo de leche; Milk bush
ARECACEAE		
	Thrinax morrisii H. Wendl.	Palma de escoba; Pandereta
ASCLEPIADACEAE		
	Metastelma decipiens Schlecht.	none
ASTERACEAE		
	Baccharis dioica Vahl	none
	Borrichia arborescens (L.) DC.	Clavelón de playa; Sea ox-eye
	Chromolaena sinuata (Lam.) R. M. King & H. Rob.	Cariaquillo: Bitter bush
	Melanthera aspera (Jacq.) Small	Salaíllo
	Pectis humifusa Sw.	Yerba de San Juan
	Tridax procumbens L.	Pancha, San Juan del monte; Tridax
	Wedelia calycina L.	Margarita de las rocas
AVICENNIACEAE		
	Avicennia germinans (L.) L.	Mangle negro; Black mangrove
BIGNONIACEAE		
	Distictis lactiflora (Vahl) DC.	Liana fragante
	Tabebuia heterophylla (DC.) Britton	Roble nativo
BORAGINACEAE		
	Argusia gnaphalodes (L.) Heine	Nigua de playa; Bay lavander

Family	Species	Common Name(s)
	Bourreria succulenta Jacq.	Palo de vaca; Pigeon berry
	Cordia rickseckeri Millsp.	Palo de lija; Sand-paper tree
	Heliotropium curassavicum L.	Cotorra de playa; Seaside heliotrope
	Tournefortia microphylla Bertero ex Spreng.	Nigüita
BRASSICACEAE		
	Cakile lanceolata (Willd.) O. E. Schulz	Mostacilla; Sea-rocket
BROMELIACEAE		
	Tillandsia recurvata (L.) L.	Nido de gungulén; Bunch moss
BURSERACEAE		
	Bursera simaruba (L.) Sarg.	Almácigo
CACTACEAE		
	Melocactus intortus (Mill.) Urb.	Melón de costa; Turk´s cap
	Opuntia dillenii (Ker-Gawl.) Haw.	Higo de mar; Prickly pear
	Pilosocereus royenii (L.) Byles & Rowley	Dildo; Organ pipe
CANELLACEAE		
	Canella winteriana (L.) Gaertn.	Barbasco; Canelle
CAPPARACEAE		
	Capparis cynophallophora L.	Bejuco inglés; Black wattle
	Capparis flexuosa (L.) L.	Palinguán; Caper tree
	Capparis indica (L) Fawc. & Rendle	Sapo prieto; Linguam
CELASTRACEAE		
	Cassine xylocarpa Vent.	Coscorrón; Marble-tree
	Crossopetalum rhacoma Crantz	Coral; Poison cherry
	Gyminda latifolia (Sw.) Urb.	Araña; False boxwood
	Maytenus laevigata (Vahl) Griseb. ex Eggers	Alfilerillo; Bois flamant
	Schaefferia frutescens Jacq.	Cafeíllo; Florida boxwood
CLUSIACEAE		
	Garcinia portoricensis (Urban) Alain	Guayabacoa, Palo de cruz
COMBRETACEAE		
	Bucida buceras L.	Úcar
	Conocarpus erecta L.	Mangle botón; Botton tree
COMMELINACEAE		
	Commelina diffusa Burm. f.	Cohitre; Blue day flower
CONVOLVULACEAE		
	Cuscuta americana L.	Bejuco de Mona; Dodder
	Evolvulus convolvuloides Stearn	none
	Evolvulus sericeus Sw.	none
	Ipomoea pes–caprae (L.) R. Br.	Bejuco playero; Bay hops
	Ipomoea steudelii Millsp.	Bejuquillo guitarra; Guitar-vine

Family	Species	Common Name(s)
	Ipomoea violacea L.	Bejuco de luna; Coast moon-vine
	Jacquemontia havanensis (Jacq.) Urban	Aguinaldo de costa
	Jacquemontia pentanthos (Jacq.) G. Don	Aguinaldo azul
	Merremia quinquefolia (L) Hall. f.	Batatilla blanca
CYPERACEAE		
	Bulbostylis pauciflora (Liebm.) Clarke	none
	Cyperus sp.	none
	Scleria lithosperma (L.) Sw.	none
EUPHORBIACEAE		
	Adelia ricinella L.	Escambrón
	Argythamnia candicans Sw.	Plateada
	Chamaesyce articulata (Aubl.) Britton	Lechoso; Little red devil, Bush spurge
	Chamaesyce messembryanthemifolia (Jacq.) Dugand	Lecherito de costa
	Chamaesyce turpinii (Boiss.) Millsp.	Lecherita
	Croton astroites Dryand.	Maná
	Croton betulinus Vahl	none
	Croton discolor Willd.	Lechecillo
	Euphorbia petiolaris Sims	Indio desnudo; Manchineel berry
	Gymnanthes lucida Sw.	Yaití; Ramón; Crabwood
	Hippomane mancinella L.	Manzanillo; Manchineel
	Jatropha gossypiifolia L.	Higuereta cimarrona
FABACEAE		
	Aeschynomene americana L.	Yerba Rosario
GOODENIACEAE		
	Scaevola plumieri (L.) Vahl.	Bosborin; Ink berry
LAURACEAE		
	Cassytha filiformis L.	Bejuco dorado; Love vine
LEG. CAESALPINACEAE		
	Caesalpinia bonduc (L.) Roxb.	Haba de San Antonio; Gray nickers
	Caesalpinia ciliata (Berg. ex Wikstr.) Urban	Mato amarillo; Yellow nickers
	***Caesalpinia culebrae* (Britton & Wilson) Alain**	**Mato de Culebra**
	Chamaecrista portoricensis (Urban) Cook & Collins	none
LEG. FABACEAE		
	Canavalia rosea (Sw.) DC.	Canavalia; Bay-bean

Family	Species	Common Name(s)
	Centrosema virginianum (L.) Benth.	Conchita de Virginia
	Dalbergia ecastaphyllum (L.) Taub.	Maraimaray
	Rhynchosia reticulata (Sw.) DC.	Frijolillo de monte
	Stylosanthes hamata (L.) Taubert in Verh.	Zarzabacoa enana; Pencil flower
	Tephrosia cinerea (L.) Pers.	Añil cenizo
	Teramnus labialis (L. f.) Sprengel	Frijolillo
LEG. MIMOSACEAE		
	Acacia tortuosa (L.) Willd.	Casia; Twisted acacia
	Leucaena leucocephala (Lam.) De Wit	Acacia pálida; Wild tamarind
	Mimosa ceratonia L.	Zarza; Black amaret
	Pithecellobium unguis-cati (L.) Mart.	Escambrón colorado; Black bean
	Prosopis juliflora (Sw.) DC.	Mesquite
MALPIGHIACEAE		
	Stigmaphyllon emarginatum (Cav.) A. Juss.	Bejuco de San Pedro
	Byrsonima lucida (Miller) L. C. Rich.	Aceituna; Candle berry
MALVACEAE		
	Gossypium barbadense L.	Algodón; Wild cotton
	Thespesia populnea (L.) Soland ex Correa	Emajagüilla; Cork tree
MORACEAE		
	Ficus citrifolia P. Miller	Jagüeillo; Boislaglu
MYRTACEAE		
	Eugenia axillaris (Sw.) Willd.	Grajo; Krum-berry
	Eugenia biflora (L.) DC.	Hoja menuda; Black rod-wood
	Eugenia foetida Pers.	Anhuila; Spanish stopper
	Eugenia foetida Pers.	Anhuila; Spanish stopper
	Eugenia monticola (Sw.) DC.	Birijí; Black cherry
NYCTAGINACEAE		
	Pisonia subcordata Sw.	Corcho blanco; Water mampoo
OLACACEAE		
	Schoepfia obovata C. Wright in Sauv.	Araña
	Ximenia americana L.	Ciruelo de la Florida; Florida plum
	Forestiera segregata (Jacq.) Krug & Urban	Florida privet, Ink-bush
ORCHIDACEAE		
	Psychilis macconnelliae Sauleda	Cañuela de costa: Mac Connell's orchid
PASSIFLORACEAE		
	Passiflora suberosa L.	Flor de pasión

Family	Species	Common Name(s)
PHYTOLACCACEAE		
	Rivina humilis L.	Carmín; Cat´s blood
POACEAE		
	Bothriochloa pertusa (L.) A. Camus	Huracán; Hurricane grass
	Cenchrus echinatus L.	Abrojo; Bur grass
	Chloris inflata Link	Horquetilla morada; Blue grass
	Chloris petraea Sw.	Yerba de dedo; Finger grass
	Chloris radiata (L.) Sw.	Grama de costa; Plush-grass
	Paspalum laxum Lam.	Matojo de arena
	Spartina patens (Ait.) Muhl.	Yerba de sal; Salt grass
	Sporobolus jacquemontii Kunth	Pelo de burro
	Sporobolus virginicus (L.) Kunth	Matojo de burro; Sea-shore rushgrass
	Uniola virgata (Poir.) Griseb.	Lágrima de San Pedro
POLYGONACEAE		
	Coccoloba krugii Lindau in Engler	Uverita playera
	Coccoloba krugii x *C. uvifera*	none
	Coccoloba microstachya Willd.	Uverillo
	Coccoloba uvifera (L.) L.	Uva de playa; Sea grape
RHAMNACEAE		
	Colubrina arborescens (Mill.) Sarg.	Abeyuelo, Sanguinaria; Greenheart
	***Colubrina elliptica* (Sw.) Briz. & Stern**	**Catire; Naked wood**
	Krugiodendron ferreum (Vahl) Urban	Bariaco; Black iron-wood
	Reynosia uncinata Urban	Cascarroya
	***Ziziphus reticulata* (Vahl) DC.**	**Azufaifo, Cascarilla**
RUBIACEAE		
	Antirhea acutata (DC.) Urban	Boje, Quina
	Catesbaea parviflora Sw.	none
	Erithalis fruticosa L.	Jayajabico; Black torch
	Ernodea littoralis Sw.	none
	Exostema caribaeum (Jacq.) Roem & Schult.	Albarillo; Prince-wood
	Guettarda elliptica Sw.	Cucubano liso; Velvet seed
	Morinda citrifolia L.	Gardenia hedionda; Indian mulberry
	Randia aculeata L.	Tintillo; Ink-berry
	Strumpfia maritima Jacq.	Lirio
RUTACEAE		
	Amyris elemifera L.	Cuabilla
	***Zanthoxylum flavum* Vahl.**	**Aceitillo; Yellow sander**
SAPINDACEAE		
	Melicoccus bijugatus Jacq.	Quenepa; Ginep
SAPOTACEAE		
	Sideroxylon obovatum Lam.	Alquitrán; Break hill

Family	Species	Common Name(s)
SCROPHULARIACEAE		
	Capraria biflora L.	Té del país; Goat weed
SOLANACEAE		
	Solanum persicifolium Dunal	Berenjena de playa; Rubia
STERCULIACEAE		
	Helicteres jamaicensis Jacq.	Cuernecillo; Cowbush
	Melochia nodiflora Sw.	Bretónica prieta
	Melochia pyramidata L.	Bretónica piramidal
	Melochia tomentosa L.	Bretónica afelpada
	Waltheria indica L.	Basora prieta, Malvavisco
THEOPHRASTACEAE		
	Jacquinia arborea Vahl	Azúcares
	Jaquinia berterii Spreng.	Mercocha
TILIACEAE		
	Corchorus hirsutus L.	Malvaté
	Corchorus siliquosus L.	Escoba blanca
TURNERACEAE		
	Turnera diffusa Willd. ex Schult.	Damiana
VERBENACEAE		
	Citharexylum fruticosum L.	Palo de guitarra; Old woman bitter
	Clerodendron aculeatum (L.) Schlecht.	Botón de oro; Crab prickly
	Lantana involucrata L.	Santa María; Button sage
	Stachytarpheta jamaicensis (L.) Vahl	Bretónica
	Stachytarpheta strigosa Vahl	Bretónica de costa
VITACEAE		
	Cissus trifoliata L.	Caro costero
ZYGOPHYLLACEAE		
	Guaiacum officinale L.	Guayacán; Lignum vitae

APPENDIX C
Bird Species List

LIST OF ALL BIRD SPECIES OBSERVED IN THE EASTERN CONSERVATION AREA, VIEQUES, PUERTO RICO
30 Jan 07– 15 Feb 07

Species	Common Name
Charadrius vociferous	killdeer
Coccyzus minor	mangrove cuckoo
Coereba flaveola	bananaquit
Dendroica adelaidae	Adelaide's warbler
Dendroica petechia	yellow warbler
Elaenia martinica	Caribbean elaenia
Falco sparverius	American kestrel
Fregata magnificens	magnificent frigatebird
Haematopus ostralegus	American oystercatcher
Melanerpes portoricensis	Puerto Rican woodpecker
Mimus polyglottos	northern mockingbird
Orthorhyncus cristatus	Antillean crested hummingbird
Pandion haliaetus	osprey
Pelecanus erythrorhynchos	American white pelican
Pelecanus occidentalis	brown pelican
Phaethon lepturus	white-tailed tropicbird
Progne dominicensis	Caribbean martin
Quiscalus niger	greater Antillean grackle
Sula leucogaster	brown booby
Tyrannus dominicensis	gray kingbird

Appendix J
Analytical Data Summary

Vieques-East
CTO-37, ECA
SMI Raw Analytical Results
February 2011

Station ID	VEECA-1DU01			VEECA-1DU02	VEECA-2DU01	VEECA-2DU02	VEECA-2DU03	VEECA-2DU04	VEECA-2DU05	VEECA-3DU01	VEECA-3DU02	VEECA-3DU03
Sample ID	VEECA-1SMI01-0211	VEECA-1SMI01T-0211	VEECA-1SMI01TT-0211	VEECA-1SMI02-0211	VEECA-2SMI01-0211	VEECA-2SMI02-0211	VEECA-2SMI03-0211	VEECA-2SMI04-0211	VEECA-2SMI05-0211	VEECA-3SMI01-0211	VEECA-3SMI02-0211	VEECA-3SMI03-0211
Sample Date	02/07/11	02/07/11	02/07/11	02/07/11	02/04/11	02/14/11	02/07/11	02/07/11	02/07/11	02/14/11	02/14/11	02/14/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	29 U	30 U	30 U	30 U	29 U	28 U	21 R	29 U	28 U	28 U	29 U	30 U
1,3-Dinitrobenzene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
2,4,6-Trinitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
2,4-Dinitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
2,6-Dinitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
2-Amino-4,6-dinitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
2-Nitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
3,5-Dinitroaniline	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
3-Nitrotoluene	29 R	30 R	30 R	30 R	29 R	28 R	30 R	29 R	28 R	28 R	29 R	30 R
4-Amino-2,6-dinitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
4-Nitrotoluene	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
HMX	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
Nitrobenzene	29 R	30 R	30 R	30 R	29 R	28 R	30 R	29 R	28 R	28 R	29 R	30 R
Nitroglycerin	58 U	59 U	61 U	61 U	58 U	57 U	59 U	58 U	57 U	57 U	58 U	59 U
Perchlorate	0.4 U	0.39 U	0.42 U	0.39 U	0.58 U	0.4 J	0.85 U	0.98 U	0.75 U	0.27 J	0.38 U	0.39 U
PETN	58 U	59 U	61 U	61 U	58 U	57 U	59 U	58 U	57 U	57 U	58 U	59 U
RDX	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
Tetryl	29 U	30 U	30 U	30 U	29 U	28 U	30 U	29 U	28 U	28 U	29 U	30 U
Total Metals (MG/KG)												
Aluminum	540	575	508	535	6,560	1,030	23,200	16,300	16,800	11,900	10,700	5,660
Antimony	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	3 U	3 U	1.7 J	3 U	6.8 J	3 U	9.3	5.9	8	3.9 J	4.8 J	3 U
Barium	7 J	7.1 J	6.6 J	7 J	14.7	7.9 J	49.3	26.1	23.4	73.2	17.2	12.4
Beryllium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.25 J	0.16 J	0.18 J	0.5 U	0.5 U	0.5 U
Cadmium	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	0.5 U	0.28 J	0.25 J	0.15 J	0.5 U	0.5 U	0.5 U
Calcium	315,000	315,000	300,000	324,000	170,000	285,000	73,500	130,000	134,000	108,000	152,000	246,000
Chromium	6.9 J	6.9 J	6.4 J	6.8 J	14.5	6.2	49.7 J	29.1 J	27.8 J	31.5	24.3	11.2
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	2.5 U	2.5 U	2.5 U	2.5 U	2 J	2.5 U	11	8	5.6	8.9	5	1.5 J
Copper	1.1 J	2.5 U	2.5 U	2.5 U	8.8 J	2.5 UJ	22.1	21.6	20.8	16.1 J	11.1 J	6.4 J
Iron	752	763	695	758	7,650	1,440	26,700	19,100	19,000	17,800	12,900	4,620
Lead	5 U	5 U	5 U	5 U	2.5 U	2.5 UJ	1.7 J	9.8	2.5 U	2.5 UJ	2.5 UJ	2.5 UJ
Magnesium	15,000	15,000	14,400	15,500	6,940	10,000	7,730	7,340	8,800	7,500	6,610	8,050
Manganese	27.9	29.7	26.4	28.5	219	46.3	651	556	396	422	203	87.7
Nickel	2.5 U	2.5 U	2.5 U	2.5 U	4 J	2.5 U	14.9	9.2	9.2	10.7	7.1	2.6 J
Potassium	169 J	165 J	156 J	177 J	1,560	293 J	4,990	3,380	3,730	2,380	2,890	1,690
Selenium	2 U	1.4 J	2.2 J	2 U	1.2 J	2 U	0.74 J	0.86 J	1.1 J	2 U	2 U	2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	2,530 J	2,520 J	2,420 J	2,650 J	1,970	2,150 J	947 J	802 J	800 J	7,230 J	8,570 J	7,260 J
Thallium	1 U	1 U	1 U	1 U	0.5 U	1 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U
Vanadium	3.9 J	3.9 J	3.6 J	3.9 J	16.2	4 J	66.7	42.5	39.3	61.6	45.4	13.2
Zinc	5 U	5 U	5 U	5 U	14.8	2.5 J	37.1	63.8	31.4	22.8 J	16.1 J	7.6 J
Wet Chemistry												
pH (ph)	7.9	NA	NA	7.7	7.7	7.8	7.8	8	8	7.6	7.9	7.7

Notes:
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed
NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity
R - Unreliable Result
U - Not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
SMI Raw Analytical Results
February 2011

Station ID	VEECA-3DU04			VEECA-3DU05	VEECA-4DU01	VEECA-4DU02			VEECA-4DU03	VEECA-4DU04	VEECA-4DU05	VEECA-4DU06
Sample ID	VEECA-3SMI04-0211	VEECA-3SMI04T-0211	VEECA-3SMI04TT-0211	VEECA-3SMI05-0211	VEECA-4SMI01-0211	VEECA-4SMI02-0211	VEECA-4SMI02T-0211	VEECA-4SMI02TT-0211	VEECA-4SMI03-0211	VEECA-4SMI04-0211	VEECA-4SMI05-0211	VEECA-4SMI06-0211
Sample Date	02/14/11	02/14/11	02/14/11	02/14/11	02/02/11	02/02/11	02/02/11	02/02/11	02/07/11	02/15/11	02/07/11	02/15/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	26 R	30 U	12 NJ	30 U
1,3-Dinitrobenzene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
2,4,6-Trinitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
2,4-Dinitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	10 R	30 U	29 U	30 U
2,6-Dinitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
2-Amino-4,6-dinitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
2-Nitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
3,5-Dinitroaniline	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
3-Nitrotoluene	28 R	29 R	29 R	29 R	28 R	30 R	30 R	29 R	30 R	30 U	29 R	30 U
4-Amino-2,6-dinitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
4-Nitrotoluene	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
HMX	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	27 NJ	30 U
Nitrobenzene	28 R	29 R	29 R	29 R	28 R	30 R	30 R	29 R	98 NJ	30 U	29 R	30 U
Nitroglycerin	56 U	58 U	58 U	58 U	55 U	59 U	59 U	58 U	60 U	61 U	59 U	61 U
Perchlorate	0.41 U	0.39 U	0.41 U	0.41 U	0.67 U	0.39 U	0.43 U	0.38 U	1.7 U	1.6 J	0.88 U	1.3 J
PETN	56 U	58 U	58 U	58 U	55 U	59 U	59 U	58 U	60 U	61 U	59 U	61 U
RDX	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
Tetryl	28 U	29 U	29 U	29 U	28 U	30 U	30 U	29 U	30 U	30 U	29 U	30 U
Total Metals (MG/KG)												
Aluminum	7,130	4,450	6,090	1,840	19,000	16,200	16,000	16,200	18,700	14,500	21,100	19,200
Antimony	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	3 U	3 U	1.9 J	3 U	17.1	33.9	35	36.1	6.1	5.4	8	13.4
Barium	11.9	9.9 J	10.9	9.1 J	33.7	20.5	20.6	21	38.8	22.3	33.9	33.6
Beryllium	0.5 U	0.5 U	0.5 U	0.5 U	0.37 J	0.19 J	0.18 J	0.2 J	0.21 J	0.5 U	0.26 J	0.22 J
Cadmium	0.5 U	0.5 U	0.5 U	0.5 U	0.26 J	0.5 U	0.5 U	0.5 U	0.28 J	0.18 J	0.23 J	0.15 J
Calcium	222,000	248,000	259,000	290,000	70,000	119,000	129,000	121,000	78,300	149,000	64,900	142,000
Chromium	15.7	10.8	14.3	6.6	32.1	39.9	38.7	39.9	47.7 J	34.6	37.1 J	36.3
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.025 U
Cobalt	3.4 J	1.7 J	2.9 J	2.5 U	5	4.5 J	4.3 J	4.5 J	11.4	7.6	12.5	7.2
Copper	7.9 J	5.1 J	7.3 J	3.1 J	19.3 J	22.2 J	20.1 J	21.3 J	21.6	17.8	24.8	21.4
Iron	8,040	5,240	7,170	1,840	20,800	21,700	20,600	21,400	23,800	18,800	27,200	22,700
Lead	2.5 UJ	2.5 UJ	5 UJ	2.5 UJ	5	2.1 J	1.7 J	2.2 J	2.5 U	2.5 U	1.7 J	1.3 J
Magnesium	9,160	9,220	9,890	9,890	7,000	15,800	15,600	16,500	6,900	6,350	7,580	5,830
Manganese	174	117	161	52.5	473	552	538	561	832	670 J	737	683 J
Nickel	4 J	2.1 J	3.6 J	2.5 U	11	11.7	11.3	11.5	12.8	9.8	13.3	12
Potassium	1,770	1,220	1,620	625	4,730	2,920	2,760	2,860	3,270	2,490	3,580	2,890
Selenium	2 U	2 U	2 U	2 U	0.91 J	0.71 J	0.71 J	0.57 J	1.1 J	0.54 J	1.6	1.7 J
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	7,160 J	6,140 J	7,860 J	7,620 J	537 J	718 J	756 J	814 J	384 J	2,490 J	273 J	225 J
Thallium	1 U	1 U	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	1 U
Vanadium	23.1	14.6	20.8	6.6 J	33.6	51.1	49.3	51.3	66.2	59.6	71.4	69.5
Zinc	11.9 J	7.6 J	10.7 J	3.8 J	35	32.6	32.1	32	33.5	28.5	39.4	34.4
Wet Chemistry												
pH (ph)	7.8	NA	NA	7.7	7.6	8.1	NA	NA	7.9	7.9	8	8.1

Notes:
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result
U - Not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
SMI Raw Analytical Results
February 2011

Station ID	VEECA-4DU07	VEECA-4DU08	VEECA-4DU09			VEECA-4DU10	VEECA-4DU11			VEECA-4DU12	VEECA-4DU13	VEECA-4DU14
Sample ID	VEECA-4SMI07-0211	VEECA-4SMI08-0211	VEECA-4SMI09-0211	VEECA-4SMI09T-0211	VEECA-4SMI09TT-0211	VEECA-4SMI10-0211	VEECA-4SMI11-0211	VEECA-4SMI11T-0211	VEECA-4SMI11TT-0211	VEECA-4SMI12-0211	VEECA-4SMI13-0211	VEECA-4SMI14-0211
Sample Date	02/15/11	02/14/11	02/15/11	02/15/11	02/15/11	02/15/11	02/03/11	02/03/11	02/03/11	02/04/11	02/03/11	02/03/11
Chemical Name												
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
1,3-Dinitrobenzene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
2,4,6-Trinitrotoluene	26 NJ	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
2,4-Dinitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
2,6-Dinitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
2-Amino-4,6-dinitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
2-Nitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
3,5-Dinitroaniline	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
3-Nitrotoluene	31 U	30 R	29 U	29 U	30 U	31 U	31 R	30 R	30 R	28 R	29 R	31 R
4-Amino-2,6-dinitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
4-Nitrotoluene	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
HMX	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
Nitrobenzene	31 U	30 R	29 U	29 U	30 U	31 U	31 R	30 R	30 R	28 R	29 R	31 R
Nitroglycerin	61 U	59 U	58 U	58 U	61 U	61 U	62 U	61 U	59 U	56 U	58 U	61 U
Perchlorate	1.2 J	1.5 J	0.92 J	1.1 J	0.84 J	0.81 J	0.52 U	0.51 U	0.47 U	0.43 U	0.39 U	0.41 U
PETN	61 U	59 U	58 U	58 U	61 U	61 U	62 U	61 U	59 U	56 U	58 U	61 U
RDX	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
Tetryl	31 U	30 U	29 U	29 U	30 U	31 U	31 U	30 U	30 U	28 U	29 U	31 U
Total Metals (MG/KG)												
Aluminum	20,400	22,100	25,200	25,900	22,500	16,000	16,500	15,500	16,500	24,400	24,600	20,200
Antimony	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	8.3	8.8	9.9	11.4	11.1	13.3	14.5 J	14.6 J	14.5 J	13.9 J	12.6 J	10.2 J
Barium	29.9	26.7	27.1	27.4	23.4	18.1	22.5	21.6	22.1	36.1	43.3	33.4
Beryllium	0.24 J	0.27 J	0.31 J	0.31 J	0.28 J	0.18 J	0.18 J	0.16 J	0.2 J	0.47 J	0.53 J	0.41 J
Cadmium	0.18 J	0.18 J	0.45 J	0.46 J	0.4 J	0.2 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Calcium	120,000	105,000	102,000	98,400	85,600	154,000	153,000	155,000	152,000	77,200	83,400	77,400
Chromium	36.9	37.2	41.9	41.7	37.2	30.6	31.3	29.1	31.3	44.6	43	38.2
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Cobalt	7.8	7.3	7.5	7.5	6.6	4.1 J	5.1	4.9 J	5.1	5.3	6.2	4.5 J
Copper	22.1	19.4 J	23.1	22.9	20.3	17.8	20.9 J	18.3 J	19.4 J	20.2 J	21.4 J	19.2 J
Iron	22,800	23,500	26,300	26,600	23,000	19,000	21,100	19,800	21,300	24,500	26,300	20,000
Lead	2.5 U	1.5 J	2 J	1.9 J	2 J	2.5 U	1.3 J	1.3 J	1.8 J	5.6	6.7	5.3
Magnesium	7,140	6,530	7,860	7,830	6,850	6,500	5,800	5,510	5,800	11,500	8,930	13,200
Manganese	584 J	528	543 J	533 J	463 J	321 J	389	371	389	540	509	473
Nickel	12.2	11.7	13.1	13	11.4	8.8	9.1	8.4	8.9	12.3	12.7	11.8
Potassium	4,180	4,460	5,400	5,470	4,810	2,660	2,530	2,370	2,540	3,820	4,840	3,180
Selenium	1.8 J	2 U	1.4 J	1.4 J	1.7 J	1.9 J	1.2 J	1.2 J	1.2 J	0.79 J	0.64 J	0.81 J
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	415 J	252 J	306 J	299 J	258 J	297 J	272 J	263 J	268 J	287 J	396 J	387 J
Thallium	1 U	1 U	0.5 U	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	48.1	48.2	48.6	49.2	43.7	39.6	47.3	44.4	48.1	46.1	44.6	39
Zinc	36.9	33.8 J	41.9	41.4	42.4	28.4	30.9	27.9	29.6	36.5	32.4	31.1
Wet Chemistry												
pH (ph)	8.1	8.2	7.9	NA	NA	8.1	8	NA	NA	7.9	8	7.6

Notes:

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

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result

U - Not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram

PH - pH units

UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
SMI Raw Analytical Results
February 2011

Station ID	VEECA-4DU15	VEECA-6DU01	VEECA-6DU02			VEECA-6DU03	VEECA-6DU04	VEECA-6DU05	VEECA-6DU06	VEECA-6DU07	VEECA-6DU08
Sample ID	VEECA-4SMI15-0211	VEECA-6SMI01-0211	VEECA-6SMI02-0211	VEECA-6SMI02T-0211	VEECA-6SMI02TT-0211	VEECA-6SMI03-0211	VEECA-6SMI04-0211	VEECA-6SMI05-0211	VEECA-6SMI06-0211	VEECA-6SMI07-0211	VEECA-6SMI08-0211
Sample Date	02/03/11	02/16/11	02/16/11	02/16/11	02/16/11	02/16/11	02/17/11	02/17/11	02/17/11	02/17/11	02/17/11
Chemical Name											
Explosives (UG/KG)											
1,3,5-Trinitrobenzene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,5-Dinitroaniline	13 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	30 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	30 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	60 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PETN	60 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)											
Aluminum	33,900	30,300	27,800	30,100	28,700	42,900	32,300	15,800	6,960	34,800	5,110
Antimony	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Arsenic	27.5 J	3.9	4.8	5.3	5	6.1	4.1	4.6	2.8	5.6	0.98 J
Barium	43.2	74.4	65.4	71.9	70.2	97.6	70.4	39.5	39.3	82.2	30.1
Beryllium	0.97 J	0.73 J	0.66 J	0.74 J	0.71 J	1.1 J	0.76 J	0.32 J	0.5 U	0.82 J	0.5 U
Cadmium	0.15 J	0.3 J	0.23 J	0.25 J	0.25 J	0.28 J	0.23 J	0.23 J	0.5 U	0.25 J	0.5 U
Calcium	26,300	23,500	32,900	32,900	37,300	14,400	21,300	43,200	123,000	20,200	102,000
Chromium	59.4	42.4 J	40 J	44.2 J	42 J	59.3 J	37.1	20.3	10.9	48.9 J	7.1
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.056	0.025 U	0.025 U	0.12 U
Cobalt	10.5	6.6	5.9	6.4	6.2	8.4	6.7	4.1 J	2.4 J	7.5	2.3 J
Copper	19.9 J	16.3	16	17.3	17.6	21.7	10.5 J	12.2 J	12.3 J	20	14.7 J
Iron	38,000	25,900	23,900	26,300	25,100	37,200	25,900	12,400	5,980	29,200	6,020
Lead	15	10.1	7.6	9.5	8.8	11.9	9.2 J	4.8 J	1.3 J	10	4 J
Magnesium	7,140	4,800	4,630	4,580	4,760	5,130	5,100	4,560	6,150	5,310	8,610
Manganese	838	763	552	580	588	851	544	411	364	660	205
Nickel	17.1	13	11.7	12.5	12.1	18.2	11.5	7.3	4.4 J	15.5	3.6 J
Potassium	7,170	6,530 J	6,090 J	6,360 J	6,320 J	7,870 J	7,580	3,810	1,240	7,900 J	1,380
Selenium	0.5 J	2.1 J	2 U	2 U	2 U	1.1 J	1.2 J	2 U	1.5 J	2.4 J	2 U
Silver	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	658 J	242 J	233 J	227 J	246 J	254 J	259 J	238 J	178 J	257 J	265 J
Thallium	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	67.6	42.4	38.4	41.5	40.1	59.4	41.1	24.7	15.7	44.2	15.2
Zinc	41.9	27.2	23.6	24.3	24.1	39.2	25.3	18.6	13.5	27.5	19.5
Wet Chemistry											
pH (ph)	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
J - Analyte present, value may or may not be accurate or precise
NA - Not analyzed

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result
U - Not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PH - pH units
UG/KG - Micrograms per kilogram

Station ID	VEECA-6DU09	VEECA-6DU10
Sample ID	VEECA-6SMI09-0211	VEECA-6SMI10-0211
Sample Date	02/17/11	02/17/11
Chemical Name		
Explosives (UG/KG)		
1,3,5-Trinitrobenzene	NA	NA
1,3-Dinitrobenzene	NA	NA
2,4,6-Trinitrotoluene	NA	NA
2,4-Dinitrotoluene	NA	NA
2,6-Dinitrotoluene	NA	NA
2-Amino-4,6-dinitrotoluene	NA	NA
2-Nitrotoluene	NA	NA
3,5-Dinitroaniline	NA	NA
3-Nitrotoluene	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA
4-Nitrotoluene	NA	NA
HMX	NA	NA
Nitrobenzene	NA	NA
Nitroglycerin	NA	NA
Perchlorate	NA	NA
PETN	NA	NA
RDX	NA	NA
Tetryl	NA	NA
Total Metals (MG/KG)		
Aluminum	11,300	5,380
Antimony	10 UJ	10 UJ
Arsenic	5.9	2.7
Barium	30.1	59.4
Beryllium	0.15 J	0.5 U
Cadmium	0.18 J	0.25 J
Calcium	99,600	158,000
Chromium	24.5 J	8.7
Chromium (hexavalent)	0.025 U	0.025 U
Cobalt	3.1 J	2 J
Copper	15.7	16.1 J
Iron	10,700	5,860
Lead	2.7 J	2.5 UJ
Magnesium	28,200	11,400
Manganese	356	317
Nickel	8	3.9 J
Potassium	1,650 J	1,060
Selenium	2 U	1.2 J
Silver	1 U	1 U
Sodium	223 J	163 J
Thallium	0.5 U	0.5 U
Vanadium	33.1	17.1
Zinc	20.2	23.5
Wet Chemistry		
pH (ph)	NA	NA

Notes:

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

NJ - Qualitative identification questionable due to poor resolution, presumptively present at approximate quantity

R - Unreliable Result

U - Not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram

PH - pH units

UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Surface Soil Raw Analytical Results
February 2011

Station ID	VEECA-1SB01	VEECA-1SB02		VEECA-2SB03	VEECA-2SB13	VEECA-3SB01	VEECA-3SB02		VEECA-3SB03
Sample ID	VEECA-1SB01-1H02-0211	VEECA-1SB02-1H02-0211	VEECA-1SB02P-1H02-0211	VEECA-2SB03-0001-0211	VEECA-2SB13-000H-0211	VEECA-3SB01-0001-0211	VEECA-3SB02-0001-0211	VEECA-3SB02P-0001-0211	VEECA-3SB03-0002-0211
Sample Date	2/8/2011	2/8/2011	2/8/2011	02/09/11	02/10/11	02/11/11	02/11/11	02/11/11	02/10/11
Chemical Name									
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
1,3-Dinitrobenzene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
2,4,6-Trinitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
2,4-Dinitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
2,6-Dinitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
2-Amino-4,6-dinitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
2-Nitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
3,5-Dinitroaniline	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
3-Nitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
4-Amino-2,6-dinitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
4-Nitrotoluene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
HMX	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
Nitrobenzene	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
Nitroglycerin	59 U	60 U	60 U	59 U	59 U	60 U	60 U	59 U	58 U
Perchlorate	0.41 U	0.42 U	0.42 U	0.33 J	0.31 J	0.51 U	0.48 U	0.51 U	0.45 U
PETN	59 U	60 U	60 U	59 U	59 U	60 U	60 U	59 U	58 U
RDX	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U	29 U
Tetryl	29 U	30 U	30 U	40 J	30 U	30 U	30 U	30 U	29 U
Total Metals (MG/KG)									
Aluminum	402 J	258 J	380 J	15,400	9,210	1,940	14,900	16,000	20,200
Antimony	2 UJ	2.1 UJ	2.1 UJ	2.3 U	2.2 U	2.7 U	2.4 U	2.6 U	2.4 U
Arsenic	7.7 UJ	7.8 UJ	7.8 UJ	21.7	3.9	2 U	5.8	13.5	7.1
Barium	6.6	4.3	6.1	28.5	16	9.6	12.3	13	21.9
Beryllium	0.1 U	0.1 U	0.1 U	0.2 J	0.11 UJ	0.13 UJ	0.11 J	0.13 J	0.18 J
Cadmium	0.1 UJ	0.1 UJ	0.1 UJ	0.06 J	0.11 U	0.13 U	0.12 U	0.13 U	0.12 U
Calcium	318,000	218,000	312,000	169,000	255,000	328,000	179,000	162,000	164,000
Chromium	7	4.7 J	6.9 J	29	17.8	8.5	30.1	31.3	37.5
Chromium (hexavalent)	0.026 U	0.026 U	0.026 U	0.14 U	0.028 U	0.033 U	0.03 U	0.032 U	0.031 U
Cobalt	0.51 U	0.52 U	0.52 U	5.9	3	0.36 J	5.7	6.7	9.1
Copper	0.76 J	0.45 J	0.66 J	19.3	11.9	2.7	11.7	13.3	20.3
Iron	675	483 J	696 J	17,300	9,290	1,560	15,400	16,800	21,500
Lead	0.51 U	2.6 U	0.52 U	1.3	0.56 U	3.3 U	0.6 U	0.64 U	0.61 U
Magnesium	14,200 J	10,200 J	13,900 J	6,880 J	8,550 J	9,080 J	5,750 J	6,310 J	7,020 J
Manganese	25.9	19.5	24.8	479	211	47.4	149	149	537
Nickel	0.3 J	0.52 U	0.26 J	10.1	4.7	0.84 J	8.9	10	11.2
Potassium	107	80.3 J	107	3,760	1,970	550	4,370	4,500	3,870
Selenium	5.1 U	5.2 U	5.2 U	1.1	0.63	0.7	0.29 J	0.57	0.52
Silver	0.2 U	0.21 U	0.21 U	0.23 UJ	0.22 UJ	0.27 UJ	0.24 UJ	0.26 UJ	0.24 UJ
Sodium	2,180	1,490 J	2,160 J	381 J	1,300	4,040	4,500	4,570	3,010
Thallium	0.1 U	0.1 U	0.1 U	0.1 J	0.056 J	0.13 U	0.091 J	0.093 J	0.077 J
Vanadium	3.4	2.6	3.6	34.9	19.8	4.7	43.3	49.2	66.7
Zinc	0.69 J	0.36 J	0.57 J	25 J	15.2 J	3 J	16.9 J	18.8 J	26.4 J
Wet Chemistry									
% Moisture (pct)	2.3	4.4	4.3	13.6	10.9	24.7	17.2	22.4	18.3
pH (ph)	8.8	NA	NA	NA	NA	7.9	7.9	NA	7.7

Notes:

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Surface Soil Raw Analytical Results
February 2011

Station ID	VEECA-1SB01	VEECA-1SB02		VEECA-3SB04	VEECA-3SB05	VEECA-4SB01	VEECA-4SS01	
Sample ID	VEECA-1SB01-1H02-0211	VEECA-1SB02-1H02-0211	VEECA-1SB02P-1H02-0211	VEECA-3SB04-001H-0211	VEECA-3SB05-0002-0211	VEECA-4SB01-001H-0211	VEECA-4SS01-0001-0211	VEECA-4SS01P-0001-0211
Sample Date	2/8/2011	2/8/2011	2/8/2011	02/14/11	02/10/11	02/18/11	02/08/11	02/08/11
Chemical Name								
Explosives (UG/KG)								
1,3,5-Trinitrobenzene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
1,3-Dinitrobenzene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
2,4,6-Trinitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
2,4-Dinitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
2,6-Dinitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
2-Amino-4,6-dinitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
2-Nitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
3,5-Dinitroaniline	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
3-Nitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
4-Amino-2,6-dinitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
4-Nitrotoluene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
HMX	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
Nitrobenzene	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
Nitroglycerin	59 U	60 U	60 U	59 U	59 U	59 U	NA	NA
Perchlorate	0.41 U	0.42 U	0.42 U	0.5 U	0.44 U	0.5 U	NA	NA
PETN	59 U	60 U	60 U	59 U	59 U	59 U	NA	NA
RDX	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
Tetryl	29 U	30 U	30 U	30 U	30 U	30 U	NA	NA
Total Metals (MG/KG)								
Aluminum	402 J	258 J	380 J	1,910	975	7,700	36,800 J	37,100 J
Antimony	2 UJ	2.1 UJ	2.1 UJ	2.5 U	2.2 U	2.5 UJ	2.3 UJ	1.5 J
Arsenic	7.7 UJ	7.8 UJ	7.8 UJ	1.9 UJ	1.7 U	5.9	23.8 J	23.7 J
Barium	6.6	4.3	6.1	10.4	8.1	15.5	43.4	44.2
Beryllium	0.1 U	0.1 U	0.1 U	0.13 U	0.11 UJ	0.13 U	0.84	0.85
Cadmium	0.1 UJ	0.1 UJ	0.1 UJ	0.063 J	0.11 U	0.1 J	0.092 J	0.091 J
Calcium	318,000	218,000	312,000	338,000	334,000	282,000	121,000	124,000
Chromium	7	4.7 J	6.9 J	8.2	6.7	22.5	65.2	65.9
Chromium (hexavalent)	0.026 U	0.026 U	0.026 U	0.031 U	0.028 U	0.032 U	0.067 J	0.067 J
Cobalt	0.51 U	0.52 U	0.52 U	0.5 J	0.56 U	5.9	8.1	8.3
Copper	0.76 J	0.45 J	0.66 J	3.7	2.2	12.1	18.9	19.2
Iron	675	483 J	696 J	4,660	1,720	11,800	37,100	38,300
Lead	0.51 U	2.6 U	0.52 U	3.1 U	0.56 U	3.2 U	29.7 J	56.1 J
Magnesium	14,200 J	10,200 J	13,900 J	10,400	10,400 J	5,430	8,330 J	8,300 J
Manganese	25.9	19.5	24.8	56.5	46.7	646	581	587
Nickel	0.3 J	0.52 U	0.26 J	1.1 J	0.49 J	6	17.5	17.7
Potassium	107	80.3 J	107	511	240	2,000	6,180	5,910
Selenium	5.1 U	5.2 U	5.2 U	1.3 U	0.4	1.3 U	2.6	2.7
Silver	0.2 U	0.21 U	0.21 U	0.25 U	0.22 UJ	0.12 J	0.23 U	0.24 U
Sodium	2,180	1,490 J	2,160 J	4,280	2,720	3,870 J	282	293
Thallium	0.1 U	0.1 U	0.1 U	0.13 U	0.11 U	0.64 U	0.27	0.26
Vanadium	3.4	2.6	3.6	8	4.4	53.9 J	65.6	66.3
Zinc	0.69 J	0.36 J	0.57 J	5.9	3 J	18	28.7	28.8
Wet Chemistry								
% Moisture (pct)	2.3	4.4	4.3	20	10.4	21.6	14.3	15.4
pH (ph)	8.8	NA	NA	7.7	7.9	8.1	7.9	NA

Notes:

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Subsurface Soil Raw Analytical Results
February 2011

Station ID	VEECA-2SB01	VEECA-2SB02		VEECA-2SB04	VEECA-2SB05	VEECA-2SB06	VEECA-2SB07	VEECA-2SB08
Sample ID	VEECA-2SB01-0103-0211	VEECA-2SB02-0103-0211	VEECA-2SB02P-0103-0211	VEECA-2SB04-0507-0211	VEECA-2SB05-0507-0211	VEECA-2SB06-0507-0211	VEECA-2SB07-0H2H-0211	VEECA-2SB08-0204-0211
Sample Date	02/09/11	02/09/11	02/09/11	02/09/11	02/09/11	02/09/11	02/08/11	02/08/11
Chemical Name								
Explosives (UG/KG)								
1,3,5-Trinitrobenzene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
1,3-Dinitrobenzene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
2,4,6-Trinitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
2,4-Dinitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
2,6-Dinitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
2-Amino-4,6-dinitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
2-Nitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
3,5-Dinitroaniline	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
3-Nitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
4-Amino-2,6-dinitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
4-Nitrotoluene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
HMX	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
Nitrobenzene	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
Nitroglycerin	59 U	60 U	60 U	59 U	59 U	59 U	59 U	59 U
Perchlorate	0.46 U	0.43 U	0.42 U	0.45 U	0.44 U	0.43 U	0.47 U	0.46 U
PETN	59 U	60 U	60 U	59 U	59 U	59 U	59 U	59 U
RDX	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
Tetryl	30 U	30 U	30 U	29 U	29 U	29 U	29 U	30 U
Total Metals (MG/KG)								
Aluminum	979	5,860	5,060	656	919	761	12,600 J	9,360 J
Antimony	2.3 U	2.1 U	2.1 U	2.2 U	2.2 U	2.2 U	2.3 UJ	2.3 UJ
Arsenic	1 J	13.8	14.3	0.34 U	0.63	0.47 J	8.8 UJ	71.8 J
Barium	7.8	11.6	11.4	6.8	7.9	7.2	30.2	40.8
Beryllium	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.12 U	0.12 U
Cadmium	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.092 J	0.048 J
Calcium	332,000	329,000	333,000	354,000	356,000	350,000	248,000	261,000
Chromium	6.6	12.8	11.4	7	6.8	6.5	26.8	17.2
Chromium (hexavalent)	0.029 U	0.13 U	0.13 U	0.028 U	0.027 U	0.027 U	0.013 J	0.15 U
Cobalt	0.32 J	2.1	2.1	0.56 U	0.43 J	0.54 U	8.4	7.3
Copper	1.9	7.7	7	0.93 J	1.7	1.1 J	14.3	9.5
Iron	1,130	8,130	7,330	1,240	2,020	1,260	17,400	14,900
Lead	0.57 U	0.31 J	0.53 U	0.56 U	0.55 U	0.54 U	2.9 U	2.9 U
Magnesium	9,920 J	3,130 J	2,840 J	12,700 J	11,500 J	11,900 J	4,880 J	6,190 J
Manganese	48.6	276	319	42.3	54.6	45.6	592	212
Nickel	0.62 J	3.8	3.6	0.46 J	0.68 J	0.47 J	10.8	7.1
Potassium	211	1,020	884	154	192	175	1,750	873
Selenium	0.54	0.5	0.57	0.41	1.9	0.36	5.8 U	1.2 U
Silver	0.23 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.22 UJ	0.22 UJ	0.23 U	0.23 U
Sodium	2,280 J	179 J	162 J	2,090 J	2,310 J	1,940 J	2,040	1,450
Thallium	0.11 U	0.063 J	0.063 J	0.11 U	0.11 U	0.11 U	0.12 U	0.12 U
Vanadium	3.5	26.7	25.6	4.6	6.5	4.5	73.1	57.4
Zinc	2 J	10.2 J	9.5 J	1.4 J	2.5 J	1.7 J	15.5	15.4
Wet Chemistry								
% Moisture (pct)	13	6	5.8	10.6	9.1	8	14.4	14.4
pH (ph)	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Subsurface Soil Raw Analytical Results
February 2011

Station ID	VEECA-2SB09		VEECA-2SB10	VEECA-2SB11	VEECA-2SB12	VEECA-2SB14	VEECA-2SB15
Sample ID	VEECA-2SB09-4H6H-0211	VEECA-2SB09P-4H6H-0211	VEECA-2SB10-0204-0211	VEECA-2SB11-7H9H-0211	VEECA-2SB12-0H2H-0211	VEECA-2SB14-1H3H-0211	VEECA-2SB15-0406-0211
Sample Date	02/08/11	02/08/11	02/10/11	02/11/11	02/11/11	02/10/11	02/10/11
Chemical Name							
Explosives (UG/KG)							
1,3,5-Trinitrobenzene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
1,3-Dinitrobenzene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
2,4,6-Trinitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
2,4-Dinitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
2,6-Dinitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
2-Amino-4,6-dinitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
2-Nitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
3,5-Dinitroaniline	29 U	30 U	29 U	29 U	30 U	30 U	29 U
3-Nitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
4-Amino-2,6-dinitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
4-Nitrotoluene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
HMX	29 U	30 U	29 U	29 U	30 U	30 U	29 U
Nitrobenzene	29 U	30 U	29 U	29 U	30 U	30 U	29 U
Nitroglycerin	59 U	59 U	59 U	59 U	59 U	60 U	59 U
Perchlorate	0.47 U	0.46 U	0.46 U	0.48 U	0.46 U	0.41 U	0.46 U
PETN	59 U	59 U	59 U	59 U	59 U	60 U	59 U
RDX	29 U	30 U	29 U	29 U	30 U	30 U	29 U
Tetryl	29 U	30 U	29 U	29 U	30 U	30 U	29 U
Total Metals (MG/KG)							
Aluminum	12,100 J	14,200 J	11,700	14,100	15,000	6,160	8,660
Antimony	2.3 UJ	2.4 UJ	2.5 U	2.5 U	2.5 U	2.1 U	2.4 U
Arsenic	1.8 UJ	1.8 UJ	5.8	14.3	7	3.9	20.6
Barium	133 J	44.7 J	15.2	14.7	12.7	12.8	14.7
Beryllium	0.12 U	0.12 U	0.077 J	0.4 J	0.12 J	0.11 UJ	0.043 J
Cadmium	0.23 J	0.26 J	0.12 U	0.12 U	0.12 U	0.11 U	0.12 U
Calcium	212,000	218,000	195,000	21,700	167,000	320,000	270,000
Chromium	28.8	33.1	26.6	50.1	28.9	12.9	17.1
Chromium (hexavalent)	0.067 J	0.15 U	0.031 U	0.031 U	0.031 U	0.13 U	0.15 U
Cobalt	8.4	9.2	12.1	19.4	7.1	4.7	8.5
Copper	11	11.9	14.7	42.8	16	10.8	18.7
Iron	20,100	23,000	13,900	36,400	16,600	10,500	15,200
Lead	2.9 U	2.9 U	0.61 U	2.3	0.62 U	0.31 J	1.2 U
Magnesium	5,100 J	5,440 J	8,400 J	6,770 J	6,830 J	3,030 J	4,350 J
Manganese	550	562	485	302	240	175	250
Nickel	9.1	9.6	8.9	16.1	8.4	4.8	8.2
Potassium	564	679	2,210	2,340	3,180	840	1,460
Selenium	1.2 U	1.2 U	0.52	0.64	0.64	0.48	0.72
Silver	0.23 U	0.24 U	0.25 UJ	0.25 UJ	0.25 UJ	0.21 UJ	0.24 UJ
Sodium	2,220	2,510	3,470	4,230	3,030	587	1,580
Thallium	0.12 U	0.12 U	0.077 J	0.09 J	0.07 J	0.11 U	0.12 U
Vanadium	72	78.8	44.4	86.3	48.4	32.3	42.2
Zinc	18.3	19.5	17.3 J	43 J	20.8 J	12.7 J	21 J
Wet Chemistry							
% Moisture (pct)	14.5	15.1	18.5	19.9	19.8	6.3	15.6
pH (ph)	NA	NA	NA	NA	NA	NA	NA

Notes:

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected at significantly greater than that in an associated blank
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Sediment Raw Analytical Results
February 2011

Station ID	VEECA-5SD01	VEECA-5SD02		VEECA-5SD03	VEECA-5SD04	VEECA-5SD05	VEECA-5SD06	VEECA-5SD07	VEECA-5SD08
Sample ID	VEECA-5SD01-000H-0211	VEECA-5SD02-000H-0211	VEECA-5SD02P-000H-0211	VEECA-5SD03-000H-0211	VEECA-5SD04-000H-0211	VEECA-5SD05-000H-0211	VEECA-5SD06-000H-0211	VEECA-5SD07-000H-0211	VEECA-5SD08-000H-0211
Sample Date	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name									
Semivolatile Organic Compounds (UG/KG)									
2,4-Dinitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
2,6-Dinitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
Nitrobenzene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
Explosives (UG/KG)									
1,3,5-Trinitrobenzene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
1,3-Dinitrobenzene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
2,4,6-Trinitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
2-Amino-4,6-dinitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
2-Nitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
3,5-Dinitroaniline	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
3-Nitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
4-Amino-2,6-dinitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
4-Nitrotoluene	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
HMX	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
Nitroglycerin	59 U	58 U	59 U	60 U	59 U	60 U	59 U	59 U	59 U
Perchlorate	0.74 U	0.56 U	0.55 U	0.57 U	0.5 U	0.56 U	0.55 U	0.55 U	0.54 U
PETN	59 U	58 U	59 U	60 U	59 U	60 U	59 U	59 U	59 U
RDX	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
Tetryl	29 U	29 U	30 U	30 U	29 U	30 U	30 U	30 U	30 U
Total Metals (MG/KG)									
Aluminum	17,700	16,100	13,700	15,900	9,450	20,000	17,100	17,300	16,700
Antimony	4 UJ	2.9 UJ	3 UJ	3 UJ	2.7 UJ	3 UJ	2.8 UJ	3.1 UJ	3 UJ
Arsenic	3.3 J	2.2 U	2.2 U	2 J	2 U	1.9 J	1.6 J	1.7 J	2.4 J
Barium	29.6	27.1	29.2	37.3	26.1	32.7	30.3	31.2	34.3
Beryllium	0.086 J	0.14 U	0.15 U	0.066 J	0.14 U	0.09 J	0.083 J	0.085 J	0.078 J
Cadmium	0.16 J	0.14 U	0.046 J	0.15 U	0.054 J	0.058 J	0.071 J	0.06 J	0.059 J
Calcium	196,000	246,000	235,000	208,000	260,000	246,000	225,000	208,000	209,000
Chromium	32.4	28.4	25.3	29	18.2	35.5	31.6	31.7	30.8
Chromium (hexavalent)	0.05 U	0.036 U	0.037 U	0.038 U	0.034 U	0.037 U	0.035 U	0.038 U	0.037 U
Cobalt	7.5	5.2	5.4	6.8	4	7.9	7.4	7.3	6.9
Copper	22.3	11.2	12.6	17	9.2	17.6	16.8	17.5	15
Iron	18,200	13,900	12,700	15,200	8,680	17,700	16,400	16,500	15,700
Lead	0.99 U	0.72 U	0.74 U	0.76 U	3.4 U	0.75 U	0.7 U	0.76 U	0.75 U
Magnesium	15,800	14,300	14,500	16,200	14,000	17,900	16,800	15,800	15,000
Manganese	418	429	392	462	355	571	538	482	496
Nickel	10	7.5	7.2	8.9	4.8	10.4	9.3	9.5	9
Potassium	6,160	5,630	4,840	5,480	3,290	6,450	5,810	5,490	5,350
Selenium	2 J	2.1 J	2.2	1.9 J	0.77 J	2.7	2.3	2.1 J	0.75 J
Silver	0.4 U	0.29 U	0.3 U	0.3 U	0.27 U	0.3 U	0.28 U	0.31 U	0.3 U
Sodium	18,800	4,370	4,510	5,590	5,290	5,810	5,030	5,770	5,860
Thallium	0.2 U	0.14 U	0.15 U	0.15 U	0.14 U	0.081 J	0.14 U	0.15 U	0.15 U
Vanadium	51.6	36.3	35.5	44.2	27	53.4	48.4	47.8	47
Zinc	28.4	19.4	18.9	22.2	12.4	25.8	25.1	24	23.2
Wet Chemistry									
% Moisture (pct)	49.5	30.9	32.6	33.8	26.7	33.1	29	34.5	33.1
pH (ph)	8	8.4	8.4	8.4	8.3	8.4	8.4	8.3	8.3
Total organic carbon (TOC) (mg/kg)	11,400	10,700	30,600	4,850	15,200	5,260	4,620	20,400	17,200

Notes:

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

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
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Sediment Raw Analytical Results
February 2011

Station ID	VEECA-5SD09	VEECA-5SD10	VEECA-5SD11		VEECA-5SD12	VEECA-5SD13	VEECA-5SD14	VEECA-5SD15
Sample ID	VEECA-5SD09-000H-0211	VEECA-5SD10-000H-0211	VEECA-5SD11-000H-0211	VEECA-5SD11P-000H-0211	VEECA-5SD12-000H-0211	VEECA-5SD13-000H-0211	VEECA-5SD14-000H-0211	VEECA-5SD15-000H-0211
Sample Date	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11	02/10/11
Chemical Name								
Semivolatile Organic Compounds (UG/KG)								
2,4-Dinitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
2,6-Dinitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
Nitrobenzene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
Explosives (UG/KG)								
1,3,5-Trinitrobenzene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
1,3-Dinitrobenzene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
2,4,6-Trinitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
2-Amino-4,6-dinitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
2-Nitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
3,5-Dinitroaniline	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
3-Nitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
4-Amino-2,6-dinitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
4-Nitrotoluene	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
HMX	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
Nitroglycerin	61 U	59 U	59 U	61 U	60 U	58 U	59 U	61 U
Perchlorate	0.56 U	0.56 U	0.5 U	0.51 U	0.55 U	0.55 U	0.52 U	0.5 U
PETN	61 U	59 U	59 U	61 U	60 U	58 U	59 U	61 U
RDX	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
Tetryl	30 U	30 U	29 U	30 U	30 U	29 U	30 U	30 U
Total Metals (MG/KG)								
Aluminum	19,000	16,600	10,900	10,000	7,180	7,520	14,300	10,900
Antimony	2.9 UJ	2.9 UJ	2.8 UJ	2.6 UJ	3 UJ	2.7 UJ	2.7 UJ	2.6 UJ
Arsenic	2.9 J	2.4 J	2.5 J	2.3 J	1.7 J	3 J	2.1 J	2.4 J
Barium	35.5	32.8	18.3	18.3	16.2	19.2	48.4	33.4
Beryllium	0.11 J	0.08 J	0.14 U	0.13 U	0.15 U	0.14 U	0.054 J	0.056 J
Cadmium	0.16 J	0.084 J	0.068 J	0.063 J	0.075 J	0.15 J	0.053 J	0.066 J
Calcium	209,000	211,000	250,000	227,000	190,000	213,000	205,000	163,000
Chromium	34.3	30.2	22.5	21.4	17.8	17.7	27	28.4
Chromium (hexavalent)	0.037 U	0.036 U	0.034 U	0.033 U	0.037 U	0.034 U	0.019 J	0.019 J
Cobalt	8.3	6.7	4	4.6	3.8	5.1	7	7.8
Copper	25.9	14	12	10.3	8.9	12	12.8	15.3
Iron	17,900	15,500	9,890	9,970	8,180	10,400	15,700	15,900
Lead	0.74 U	0.73 U	0.69 U	0.65 U	0.74 U	0.68 U	0.68 U	0.66 U
Magnesium	17,000	14,300	9,030	9,170	8,750	9,050	13,800	9,460
Manganese	522	454	310	324	274	340	498	390
Nickel	10.8	9	5.9	5.8	5	6.3	8.6	9.3
Potassium	6,490	5,820	3,480	3,080	2,240	1,730	4,370	1,870
Selenium	2.4	1.9 J	2.1 J	1 J	1.6 J	0.83 J	2.3	1 J
Silver	0.29 U	0.29 U	0.28 U	0.26 U	0.3 U	0.27 U	0.27 U	0.26 U
Sodium	6,100	6,290	4,100	3,670	5,020	3,350	4,730	3,030
Thallium	0.15 U	0.15 U	0.14 U	0.13 U	0.15 U	0.14 U	0.14 U	0.13 U
Vanadium	52.6	40.5	30.7	32.7	29.9	43.5	47.9	62.3
Zinc	27.2	22.1	14.2	13.5	12.8	13.9	18.8	21.9
Wet Chemistry								
% Moisture (pct)	32.2	31.1	27.4	23.5	32.5	26.7	26.5	24.4
pH (ph)	8.3	8.2	8.4	8.4	8.1	8.2	8.4	8.2
Total organic carbon (TOC) (mg/kg)	14,000	14,000	21,900	31,100	18,400	15,500	11,300	14,100

Notes:

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

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
PH - pH units
UG/KG - Micrograms per kilogram

Vieques-East
CTO-37, ECA
Surface Water Raw Analytical Results
February 2011

Station ID	VEECA-5SW01	VEECA-5SW02		VEECA-5SW03	VEECA-5SW04	VEECA-5SW05
Sample ID	VEECA-5SW01-0211	VEECA-5SW02-0211	VEECA-5SW02P-0211	VEECA-5SW03-0211	VEECA-5SW04-0211	VEECA-5SW05-0211
Sample Date	02/09/11	02/09/11	02/09/11	02/09/11	02/09/11	02/09/11
Chemical Name						
Explosives (UG/L)						
1,3,5-Trinitrobenzene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
1,3-Dinitrobenzene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
2,4,6-Trinitrotoluene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
2,4-Dinitrotoluene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
2,6-Dinitrotoluene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
2-Amino-4,6-dinitrotoluene	0.099 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitrotoluene	0.099 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
3,5-Dinitroaniline	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
3-Nitrotoluene	0.099 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Amino-2,6-dinitrotoluene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
4-Nitrotoluene	0.099 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
HMX	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
Nitrobenzene	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
Nitroglycerin	0.5 U	0.5 U	0.5 U	0.52 U	0.52 U	0.51 U
Perchlorate	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
PETN	0.5 U	0.5 U	0.5 U	0.52 U	0.52 U	0.51 U
RDX	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
Tetryl	0.05 U	0.05 U	0.05 U	0.052 U	0.052 U	0.051 U
Total Metals (UG/L)						
Aluminum	2,740 J	1,960 J	2,040 J	2,990 J	2,010 J	2,700 J
Antimony	4 U	4 U	4 U	4 U	4 U	4 U
Arsenic	2 J	1.5 J	1.5 J	1.7 J	1.4 J	1.9 J
Barium	72.4 J	67.6 J	67.4 J	72.4 J	68.8 J	71.1 J
Beryllium	10 U	10 U	10 U	10 U	10 U	10 U
Cadmium	10 U	10 U	10 U	10 U	0.5 U	10 U
Calcium	622,000	591,000	597,000	612,000	604,000	606,000
Chromium	4.8 J	4.2 J	5.3	7.5	4.2 J	6.2
Chromium (hexavalent)	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Cobalt	3.1	2.8 J	2.7 J	3	3	2.9 J
Copper	12	11.8	10.7	11.5	12.1	11.2
Iron	2,060	1,700	1,950	2,530	1,910	2,140
Lead	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium	708,000	686,000	683,000	699,000	698,000	699,000
Manganese	73 J	56.5 J	57.1 J	77.5 J	59 J	71.2 J
Nickel	2 U	2 U	3.6	1.5 J	2.4 R	2.2 J
Potassium	193,000	184,000	186,000	190,000	186,000	189,000
Selenium	17	2.2 R	2.9 J	2.5 R	5 U	2.5 R
Silver	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sodium	5,710,000 J	5,570,000 J	5,570,000 J	5,650,000 J	5,740,000 J	5,590,000 J
Thallium	0.54 J	1 U	1 U	1 U	0.7 J	1 U
Vanadium	14	13.1	11.7 J	13.9	11.3 J	13.2
Zinc	100 U	100 U	100 U	100 U	100 U	100 U
Dissolved Metals (UG/L)						
Aluminum, Dissolved	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Antimony, Dissolved	4 U	4 U	4 U	4 U	4 U	4 U
Arsenic, Dissolved	2 U	2 U	2 U	2 U	1.1 J	2 U
Barium, Dissolved	63.9 J	64.7 J	61.8 J	62.4 J	64 J	67.7 J
Beryllium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U
Cadmium, Dissolved	10 U	10 U	10 U	10 U	10 U	10 U
Calcium, Dissolved	560,000	576,000	555,000	551,000	560,000	581,000
Chromium, Dissolved	4 U	4 U	4 U	4 U	4 U	4 U
Chromium (hexavalent), Dissolved	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Cobalt, Dissolved	1.9 J	1.8 J	1.8 J	1.8 J	2 J	1.9 J
Copper, Dissolved	10	10.3	10.2	10.2	10.5	9.9
Iron, Dissolved	85.9 J	62.7 J	72.3 J	49.7 J	40.9 J	252
Lead, Dissolved	1 U	1 U	1 U	1 U	1 U	1 U
Magnesium, Dissolved	661,000	686,000	656,000	652,000	661,000	677,000
Manganese, Dissolved	50 U	50 U	50 U	50 U	50 U	50 U
Nickel, Dissolved	2.3 J	1.2 J	2 U	1.5 J	5.3 R	3.9
Potassium, Dissolved	180,000	184,000	178,000	177,000	179,000	187,000
Selenium, Dissolved	27 J	7.2 R	26.2 J	12.8 R	19.2 J	18.3 R
Silver, Dissolved	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Sodium, Dissolved	5,270,000 J	5,620,000 J	5,440,000 J	5,230,000 J	5,300,000 J	5,490,000 J
Thallium, Dissolved	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium, Dissolved	4.1 J	4.4 J	5.5 J	4.3 J	3.4 J	5.3 J
Zinc, Dissolved	100 U	100 U	100 U	100 U	100 U	100 U

Notes:
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - Not detected or not detected at significantly greater than that in an associated blank.
UJ - Analyte not detected, quantitation limit may be inaccurate
UG/L - Micrograms per liter

Appendix K
Human Health Risk Assessment

Table of Contents

Section **Page**

Human Health Risk Assessment for Eastern Conservation Area (UXO 1) K-1

1.1 Introduction K-1
1.1.1 Overview K-1
1.1.2 Scope of the Risk Assessment K-1
1.1.3 Potential Receptors K-1
1.2 Data Evaluation K-3
1.2.1 Data Used in the HHRA K-3
1.2.2 Selection of Chemicals of Potential Concern K-3
1.2.3 Hot Spot Evaluation K-4
1.3 Exposure Assessment K-5
1.3.1 Exposure Pathways Quantified K-5
1.3.2 Quantification of Exposure K-7
1.4 Toxicity Assessment K-8
1.4.1 Non-Carcinogenic Toxicity Values K-8
1.4.2 Carcinogenic Toxicity Values K-8
1.4.3 Derivation of Dermal Toxicity Values K-8
1.5 Risk Characterization K-8
1.5.1 Approach for Potential Non-Carcinogenic Effects K-8
1.5.2 Approach for Potential Carcinogenic Effects K-9
1.5.3 Summary of Risk Estimates K-10
1.5.4 Summary of Chemicals of Concern K-11
1.5.5 Uncertainty Analysis K-11
1.6 References K-12

Attachments

K-1 RAGS Part D Tables
K-2 Tables and Figures
K-3 Analytical Data Used in the HHRA
K-4 ProUCL Output

Acronyms and Abbreviations

$\mu g/m^3$	Microgram per Cubic Meter
Cal/EPA	California Environmental Protection Agency
CDI	Chronic Daily Intake
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DABS	Dermal Absorption Fraction from Soil
EC	Exposure Concentration
ECA	Eastern Conservation Area
ELCR	Excess Lifetime Cancer Risk
EPA	U.S. Environmental Protection Agency
EPC	Exposure Point Concentration
ERP	Environmental Restoration Program
ft	Foot/Feet
FWS	U.S. Fish and Wildlife Service
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
MCL	Maximum Contaminant Level
mg/kg	Milligram per Kilogram
mg/kg-day	Milligram per Kilogram per Day
mg/m^3	Milligram per Cubic Meter
PEF	Particulate Emission Factor
PREQB	Puerto Rico Environmental Quality Board
PPRTV	Provisional Peer-Reviewed Toxicity Value
RAGS	Risk Assessment Guidance for Superfund
RI	Remedial Investigation
RSL	Regional Screening Level
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable Maximum Exposure
SAP	Sampling and Analysis Plan
UCL	Upper Confidence Limit

APPENDIX K

Human Health Risk Assessment for Eastern Conservation Area (UXO 1)

1.1 Introduction

1.1.1 Overview

This human health risk assessment (HHRA) was prepared for the Eastern Conservation Area (ECA), UXO 1 ("the Site"), located at the Former Vieques Naval Training Range, Vieques, Puerto Rico. The approach and assumptions used in the HHRA were presented in the Pre-interim and Interim Deliverables for the Human Health Risk Assessment at UXO 1 (CH2M HILL, 2011a and 2011b, respectively), hereinafter referred to as the Pre-Interim and Interim Deliverable, respectively.

As presented in the HHRA protocol contained in the *Master Standard Operating Procedures, Protocols, and Plans* (CH2M HILL, 2010), hereinafter referred to as the Vieques Master HHRA protocol, for sites in the Vieques Environmental Restoration Program (ERP), and in accordance with the U.S. Environmental Protection Agency (EPA) guidance documents, this HHRA consists of a four-step evaluation process compromised of:

- Data evaluation
- Exposure assessment
- Toxicity assessment
- Risk characterization

1.1.2 Scope of the Risk Assessment

The HHRA was prepared in accordance with the Pre-Interim and Interim Deliverable (and associated regulatory comments) and the Vieques Master HHRA protocol. The protocol is consistent with EPA Region II policy and EPA guidance, primarily: *Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual, Parts A, D, E, and F* (EPA, 1989, 2001, 2004, 2009a), and *Human Health Evaluation Manual*, *Standard Default Exposure Factors* (EPA, 1991). In addition, other EPA guidance documents were used and are cited in the text and tables. The supporting tables for this HHRA are presented in RAGS Part D format (EPA, 2001) in **Attachment K-1**. As indicated in the Interim Deliverable, because the Master HHRA protocol does not provide exposure factors for the specific receptors at UXO 1 (e.g., Unites States Fish and Wildlife Service [FWS] workers), the EPA, the Puerto Rico Environmental Quality Board (PREQB), FWS, and the U.S. Navy developed the conservative approaches used in the HHRA, as presented in the Sampling and Analysis Plan (SAP; CH2M HILL, 2011c).

1.1.3 Potential Receptors

UXO 1 was transferred to the Department of the Interior to be managed by the FWS as a National Wildlife Refuge; access to the public is not planned nor likely (via trespassing). The Vieques Master HHRA protocol indicates that when sites cannot be released for unrestricted use (e.g., sites within lands Congressionally-mandated otherwise), the Navy may choose not to evaluate the residential land use or other infeasible exposure scenarios. The existing legal land use controls accompanying the Congressional transfer of the UXO 1 property to the FWS render future residential land unrealistic without a subsequent Congressional act. Therefore, the following potential receptors were evaluated in the HHRA:

- **Current/Future FWS Workers** – workers who may conduct wildlife management activities onsite
- **Current/Future Trespassers**– adults, youths, and children who may occasionally trespass at the site
- **Current/Future Coast Guard Workers** – workers who maintain the onsite light post
- **Current/Future FWS Law Enforcement Workers** – workers who may conduct law enforcement activities onsite

Current/Future FWS Workers –FWS Workers were quantitatively evaluated for potential exposures to site-related constituents based on their anticipated work activities and exposure areas. The following five exposure scenarios

were identified for FWS Workers and were evaluated in the HHRA. **Table 1** of **Attachment K-2** summarizes exposure scenarios and data groupings used to evaluate each scenario.

- FWS Worker #1 – Current/future FWS workers who engage in site-wide wildlife surveillance and monitoring (e.g., migratory water fowl)
- FWS Worker #2 – Current/future FWS workers who engage in sea turtle monitoring and conservation activities at Bahia Playa Blanca Beach only.
- FWS Worker #3 – Future FWS upland dry forest restoration workers who conduct restoration, surveillance and monitoring of the Uplands only.
- FWS Worker #4 – Future FWS lowland forest restoration workers who conduct restoration, surveillance and monitoring of the Lowlands only.
- FWS Worker #5 - Future FWS workers who engage in wildlife surveillance and monitoring (e.g., migratory water fowl) at the lagoon fringe only.

Potential current/future trespassers, Coast Guard workers, and FWS law enforcement workers were qualitatively evaluated in the HHRA, as indicated in **Table 1 of Attachment K-1** and discussed below.

Current/Future Trespassers – Occasional trespassers were qualitatively evaluated for potential exposures to site-wide surface soil (0-2 feet) through ingestion, dermal contact and inhalation. Additionally, occasional trespassers were qualitatively evaluated for potential consumption of land crab caught near the onsite lagoon, dermal contact with surface water in the lagoon, and incidental ingestion and dermal contact with sediment in the lagoon. However, trespassers are unlikely to access UXO 1 due to the inaccessible nature of the site: the site is remote, it is only accessible through the Live Impact Area, the roads that access the site are rough and unpaved, and there are not unique, appealing characteristics of UXO 1 that cannot be found in more easily accessible locations elsewhere. UXO 1 cannot be readily accessed via boat or small craft due to the shallow reef and cliff elevation. In addition, FWS law enforcement workers would arrest and remove trespassers from the site. Due to the inaccessibility of the site by potential trespassers and the likelihood they would be removed if found onsite, risk estimates for FWS workers conducting surveillance, restoration and conservation activities (and potentially contacting soil, surface water, and sediment during these activities) can be used as conservative estimates of potential trespasser risks; potential risks associated with consumption of land crab caught near the onsite lagoon are expected to be negligible for trespassers due to the very low exposure frequency anticipated for onsite trespassers.

Current/Future Coast Guard Workers - Coast Guard workers were qualitatively evaluated for potential exposures to surface soil (0-1 foot) near the light post area through ingestion, dermal contact and inhalation. Coast Guard workers are expected to have insignificant exposure to site soil based on the nature and short duration of maintenance activities (annually changing the light bulb and battery) at the light post area. Therefore, risk estimates for FWS workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of Coast Guard worker risks.

Current/Future FWS Law Enforcement Workers - FWS law enforcement workers were qualitatively evaluated for potential exposures to site-wide surface soil (0-2 feet) through ingestion, dermal contact and inhalation. FWS law enforcement workers conducting emergency or infrequent response activities are expected to have insignificant exposure to site-wide soil based on the nature of the activities they are conducting and the short-term duration of their activities. Therefore, risk estimates for FWS workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of potential FWS law enforcement worker risks.

Current/Future Volunteers and Researchers - Volunteers or researchers may occasionally be present on-site but are expected to have less exposure to site soil than FWS workers due to a lower exposure frequency and duration than FWS workers (who are assumed to be present onsite at various exposure frequencies ranging from 12 to 130 days/year [depending on FWS worker type] for 25 years). Therefore, risk estimates for FWS workers conducting surveillance, restoration and conservation activities can be used as conservative estimates for potential risks to volunteers and researchers.

The human health conceptual site model (CSM) for UXO 1 presents potential exposure media, exposure points, receptors (current and future), and exposure routes, and is provided in **Table 1** of **Attachment K-1** and graphically in **Figure 1 of Attachment K-2**.

1.2 Data Evaluation

1.2.1 Data Used in the HHRA

Soil, sediment, and surface water samples collected in February 2011 during the Remedial Investigation (RI) were used in the HHRA. The soil dataset consists of 11 discrete soil samples collected from the 0-2 foot interval and 27 incremental samples collected from the 0-2 inch interval.

Soil data were divided into five sample populations based on potential exposure scenarios at the site. Consistent with Attachment C of the SAP (CH2MHILL, 2011c), surface soil data were collected at four Decision Units; subsurface exposures are not addressed in the HHRA since subsurface soil is not present everywhere and subsurface activities occur at a low frequency for FWS workers:

- Bahia Playa Blanca Beach: 2 discrete (1.5 to 2 feet) and 2 incremental samples (0-2 inches) surface soil samples.
- Uplands: 2 discrete (2 inches to 1.5 feet) and 15 incremental samples (0 to 2 inches) surface soil samples.
- Lowlands: 2 discrete (2 inches to 1 foot) and 5 incremental samples (0 to 2 inches) surface soil samples.
- Lagoon Fringe: 5 discrete (2 inches to 2 feet) and 5 incremental samples (0 to 2 inches) surface soil samples.

In addition to the four soil Decision Units, a site-wide surface soil data grouping was assessed for potential soil exposures, consistent with Appendix C of the SAP (CH2MHILL, 2011c):

- Site-Wide: 9 discrete (2 inches to 1 foot, 2 inches to 1.5 feet, and 2 inches to 2 feet; excluding the Bahia Playa Blanca Beach discrete samples from deeper surface soil because these soils would only be encountered during specific Beach decision unit activities [i.e., turtle nesting monitoring]) and 27 incremental (0 to 2 inches) surface soil samples.

Subsurface soil (deeper than 2 feet) was not identified as an exposure point for potentially complete exposure pathways (as discussed in Section 1.3); rather, subsurface soil was sampled to help evaluate leaching potential. Therefore, samples collected at depths below 2 feet were not evaluated in the HHRA. Refer to Section 4.2.1 of the Report, which includes an evaluation of constituents detected above their respective SSLs.

The sediment and surface water datasets consist of 15 and 5 samples, respectively, collected from the lagoon. Sampling locations for soil, sediment and surface water samples are depicted on **Figures 2 and 3** in **Attachment K-2**.

Table 1 of **Attachment K-2** presents the sample groupings assigned to each FWS worker type in the HHRA. A summary of the specific samples used in the HHRA and their associated groupings are presented in **Table 2 and Table 3 of Attachment K-2**. Soil, sediment and surface water samples were analyzed for inorganics, explosives, and hexavalent chromium. A copy of the analytical dataset for the samples used in the HHRA is included in Excel format as **Attachment K-3**.

1.2.2 Selection of Chemicals of Potential Concern

The chemicals of potential concern (COPCs) are those chemicals that have the greatest potential to cause adverse human health effects if receptors come in contact with site media. COPCs were selected in accordance with the Vieques Master HHRA protocol (CH2M HILL, 2010).

USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA, 2011a) were used to screen site data. The maximum detected concentrations in surface soil (various depths; see Section 1), sediment, and surface water were compared to RSLs to identify COPCs for the HHRA. The RSLs are based on a target excess lifetime cancer risk (ELCR) of $1x10^{-6}$ and a non-cancer hazard quotient (HQ) of 1. The RSLs for non-carcinogenic effects were adjusted downward by a factor of 10 to account for cumulative non-cancer effects, with the exception of lead. EPA considers lead to be a special case because of the difficulty in identifying the classic "threshold" needed to develop a reference dose (RfD). The industrial soil RSL for lead is 800 mg/kg and is based upon the Adult Lead Methodology (EPA, 2009b) for blood lead levels in workers and, therefore, was not adjusted downward by a factor

of 10. All samples used in the HHRA were analyzed for total chromium and hexavalent chromium. The RSLs for trivalent chromium were used to screen total chromium results, and the RSLs for hexavalent chromium were used to screen hexavalent chromium results.

For samples with field duplicate analyses, the higher of the two concentrations was used when both values were detects and the lower of the two reporting limits was used when both values were non-detects. In cases where one result was a detect and the other a non-detect, the detected value was used.

1.2.2.1 COPC Screening Levels

The Vieques Master HHRA protocol does not indicate how media concentrations should be screened for FWS workers. Therefore, the chemicals detected in soil and sediment were screened using the industrial soil RSLs to evaluate direct contact with soil and sediment. Since the industrial soil RSLs are based on a default exposure frequency of 250 days/year for 25 years, whereas the site-specific FWS worker exposure frequency is much lower (ranging from 12 to 130 days per year, depending on the FWS worker group), the soil screening levels are conservative for the site. The chemicals detected in surface water samples collected from the lagoon were compared to tap water RSLs to evaluate potential direct contact exposures to surface water. Use of the tap water RSLs is also conservative since the tap water RSLs are based on an exposure frequency of 350 days/year for 30 years at an ingestion rate of 2 liters per day, whereas the site-specific exposure frequency is much lower (52 days/year) for dermal and inhalation exposures (ingestion exposures are not assumed to occur onsite).

1.2.2.2 COPC Screening Results

Results of the COPC screening process for each receptor group are presented in **Tables 2.1 through 2.7 of Attachment K-1.**

Results of the COPC screening are summarized below:

- FWS Worker #1 – One inorganic (arsenic) was identified as a COPC in site-wide surface soil (**Table 2.1 of Attachment K-1**). One inorganic (arsenic) was identified as a COPC in lagoon sediment (**Table 2.3 of Attachment K-1**). Three inorganics (arsenic, cobalt, and thallium) were identified as COPCs in lagoon surface water (**Table 2.4 of Attachment K-1**).
- FWS Worker #2 – One inorganic (arsenic) was identified as a COPC in Bahia Playa Blanca Beach surface soil (**Table 2.2 of Attachment K-1**).
- FWS Worker #3 – One inorganic (arsenic) was identified as a COPC in Upland surface soil (**Table 2.5 of Attachment K-1**).
- FWS Worker #4 – One inorganic (arsenic) was identified as a COPC in Lowland surface soil (**Table 2.6 of Attachment K-1**).
- FWS Worker #5 – One inorganic (arsenic) was identified as a COPC in lagoon sediment (**Table 2.3 of Attachment K-1**). Three inorganics (arsenic, cobalt, and thallium) were identified as COPCs in lagoon surface water (**Table 2.4 of Attachment K-1**). One inorganic (arsenic) was identified as a COPC in lagoon fringe surface soil (**Table 2.7 of Attachment K-1**).

1.2.2.3 Background Comparisons

The maximum detected concentrations of inorganics in surface soil were also compared to background soil concentrations established for UXO 1. The maximum detected concentration of arsenic from the Bahia Playa Blanca Beach surface soil was less than the background concentration (**Table 2.2 of Attachment K-1**); however, arsenic was not eliminated as a COPC based on comparison to background. Refer to Section 4.2.1 and 4.2.2 of the Report for discussions on how background levels at UXO 1 were established.

1.2.3 Hot Spot Evaluation

In the HHRA pre-interim deliverable, a review of site data was conducted to determine if potential hot spots were present in exposure media that may require a separate exposure evaluation. The detected concentrations were compared to 10 times the adjusted industrial soil and tapwater RSLs (i.e., resulting in an HQ = 1.0 and ELCR of $1x10^{-}$

[5]) to determine the presence (if any) of a discrete area where concentrations are considerably higher than those present in the surrounding area.

As seen in **Figure 2 of Attachment K-2**, detected concentrations of arsenic at 5 soil sampling locations exceeded 10 times their respective industrial soil RSLs. Among the chemicals detected in surface water, only arsenic, thallium, and cobalt exceeded their tapwater RSL, and arsenic and thallium exceeded 10 times their RSLs (**Figure 3 of Attachment K-2**).

Overall, a graphical review of site soil data indicates that the detected concentrations are distributed relatively evenly without any discrete area of elevated concentrations. Therefore, it was concluded that no discrete hot spots are present that warrant separate risk evaluation. Further, arsenic, thallium, and cobalt are not significant components of munitions.

1.3 Exposure Assessment

1.3.1 Exposure Pathways Quantified

The potential exposure pathways quantified for each receptor group are presented below:

- FWS Workers #1– Ingestion, dermal contact, and inhalation exposure to arsenic in site-wide surface soil (0-2 feet), ingestion and dermal contact to arsenic in lagoon sediment, and dermal contact to the three COPCs in lagoon surface water were quantified for FWS Worker #1; exposure point concentrations (EPCs) are presented in **Table 3.1. RME, 3.3. RME** and **3.4. RME** of **Attachment K-1**, respectively.
- FWS Workers #2– Ingestion, dermal contact, and inhalation exposure to arsenic in Bahia Playa Blanca Beach surface and deeper surface soil (0-2 feet) were quantified for FWS Worker #2; the EPC is presented in **Table 3.2. RME** of **Attachment K-1**.
- FWS Workers #3– Ingestion, dermal contact, and inhalation exposure to arsenic in Uplands surface soil (0-1.5 feet) were quantified for FWS Worker #3; the EPC is presented in **Table 3.5. RME** of **Attachment K-1**.
- FWS Workers #4– Ingestion, dermal contact, and inhalation exposure to arsenic in Lowlands surface soil (0-1 foot) were quantified for FWS Worker #4; the EPC is presented in **Table 3.6. RME** of **Attachment K-1**.
- FWS Workers #5– Ingestion and dermal contact to arsenic in lagoon sediment, dermal contact to the three COPCs in lagoon surface water, and ingestion, dermal contact, and inhalation exposure to arsenic in lagoon fringe surface soil (0-2 feet) were quantified for FWS Worker #5; EPCs are presented in **Table 3.3. RME**, **3.4. RME**, and **3.7. RME** of **Attachment K-1**, respectively.

During the project scoping, the depth intervals of interest were identified based on exposure potential for various types of FWS worker activities, consisting of:

- FWS Wildlife Survey and Monitoring Workers (FWS Worker #1) - 0-2 inch depth interval for most samples (27 of 36 samples) based on the surface soil depth interval expected to show maximum impact (due to the chemical release mechanism being airborne deposition) and the most likely depth interval for FWS worker contact when performing surveying and monitoring activities; 9 samples from deeper surface soil intervals (2 inches to 24 inches) were included in the dataset since FWS Workers may be involved in vegetation restoration activities in areas of the site where deeper surface soil is present.
- FWS Sea Turtle Monitoring Workers (FWS Worker #2) - 0-2 inch and 18-24 inch depth intervals for FWS workers performing sea turtle monitoring and conservation activities in the Bahia Playa Blanca Beach unit based on the depth interval expected to show maximum impact (0-2 inches, based on the chemical release mechanism being airborne deposition) and the depth to which FWS workers dig when burying or counting sea turtle egg hatching success (18-24 inches).
- FWS ECA Upland Dry Forest Restoration Workers (FWS Worker #3) - 0-2 inch depth interval for most samples (15 of 17 samples) based on the surface soil depth interval expected to show maximum impact (due to the chemical release mechanism being airborne deposition) and the most likely depth interval for FWS worker

contact when performing restoration activities; 2 samples from deeper surface soil intervals (2 inches to 18 inches) were included in the dataset since FWS workers may be involved in vegetation restoration activities in areas of the site where deeper surface soil is present; the depth of 18 inches was limited by the depth to bedrock.

- FWS ECA Lowland Forest Restoration Workers (FWS Worker #4) - 0-2 inch depth interval for most samples (5 of 7 samples) based on the surface soil depth interval expected to show maximum impact (due to the chemical release mechanism being airborne deposition) and the most likely depth interval for FWS worker contact when performing restoration activities; 2 samples from deeper surface soil intervals (2 inches to 12 inches) were included in the dataset since FWS Workers may be involved in vegetation restoration activities in areas of the site where deeper surface soil is present; the depth of 12 inches was limited by the depth to bedrock.
- FWS Lagoon Fringe Workers (FWS Worker #5) - 0-2 inch depth interval for all 5 samples based on the surface soil depth interval expected to show maximum impact (due to the chemical release mechanism being airborne deposition) and the most likely depth interval for FWS worker contact when performing surveying and monitoring activities, the remaining portion of the surface soil interval for all 5 samples defined where land crab are potentially present (0-24 inches).

Subsurface soil is not present at UXO 1 except at the Bahia Playa Blanca Beach and the Lagoon Fringe area. Subsurface soil is generally not present in other areas (uplands and lowlands) due to the shallow depth of bedrock, although there may be some small areas where subsurface soil exists. FWS workers performing conservation activities are expected to contact surface soil only, including deeper surface soil up to 24 inches below ground surface. Due to the relatively inaccessible location of UXO 1 and its location within a National Wildlife Refuge, future excavation activities on the site are not likely. FWS workers involved in tree planting as part of vegetation restoration may occasionally encounter locations where subsurface soil is present, but the frequency would be very seldom and the planting depths (based on observed soil profiles and likely sizes of vegetation samplings planted) would not likely be deeper than 2 feet.

The only potential receptors present near the onsite lagoon are FWS workers and occasional volunteers and researchers working with FWS staff. The FWS worker activities at the lagoon consist of waterfowl monitoring and do not include activities that may lead to ingesting surface water (i.e., swimming). FWS workers at the lagoon wear waders and wade only near the lagoon edge and during kayak launching/landing. Therefore, surface water ingestion is not a reasonable exposure scenario for FWS workers due to the lack of activities resulting in, and limited opportunities for, incidental ingestion. Based on discussions with FWS, a FWS worker would be expected to enter the lagoon approximately 15 percent of the time that they are in the lagoon vicinity.

Land crabs are present or potentially present in the lagoon fringe. Based on FWS' Comprehensive Conservation Plan (CCP), public access is not planned and is considered trespassing. The site is very remote (compared to the proximity of general public access points) and accessible only through the Live Impact Area, which is a Congressionally-mandated Wilderness Area where public access is not permitted. In addition, the roads that access the site are rough and unpaved, and there are not unique, appealing characteristics of UXO 1 that cannot be found in more easily accessible locations elsewhere. In addition, coral reefs and steep cliffs are present along the coastline, which limit boat access to the site. Therefore, trespassing is not expected and would be very infrequent, if at all. Therefore, a reasonable maximum exposure (RME) scenario does not include consumption of land crab by trespassers.

Groundwater at UXO1 will not be developed for potable use because of the site's location within a National Wildlife Refuge. Therefore, the groundwater exposure pathway is incomplete. Additionally, analytical data collected across the site indicate potential leaching of contaminants to groundwater on a site-wide basis is insignificant. Specifically, only one detection of one explosive in one surface soil sample was above its SSL. In fact, explosives data in soil across the site show there is not widespread explosives contamination in soil. Additionally, the concentrations of inorganics detected at the site, regardless of their relationship to screening criteria, are likely attributable to background. Therefore, groundwater was not evaluated in the RI.

1.3.2 Quantification of Exposure

To evaluate the potentially complete exposure pathways further, the magnitude, frequency, and duration of exposures were estimated and quantified. EPCs were identified and pathway-specific intakes were estimated. EPA guidance (1989) recommends selecting intake variable values for a given pathway so that the combination of all intake variable values results in an estimate of the RME for that pathway. EPA recommends using upper-bound parameter values (as opposed to average values) for exposure frequency and exposure duration. EPA guidance recommends that the contact rate be a value representing the 95th percentile.

1.3.2.1 Exposure Point Concentrations

For each soil, sediment, and surface water COPC identified for a receptor group where eight or more samples are available in the dataset, the upper confidence limit (UCL) on the mean concentration was calculated using the most recent version of ProUCL (Version 4.1.00; EPA, 2011b) and used as the EPC. The UCL concentrations are presented in **Tables 3.1. RME** through **3.7. RME of Attachment K-1**, and the ProUCL output is provided in **Attachment K-4**.

The discrete and incremental samples in the data groupings for each FWS worker type were evaluated to identify soil EPCs. **Table 4 of Attachment K-2** presents a comparison of the summary statistics and UCL concentrations for each FWS worker type based on the use of incremental samples and discrete samples. The comparison was performed for the following sample groupings: incremental samples and discrete samples, incremental samples only, and discrete samples only. The comparisons indicate that the EPCs for each sample grouping are relatively similar; therefore, to obtain a larger sample dataset representative of the soil profile within the exposure area, the combined incremental sample and discrete sample data grouping for each FWS worker type was used to calculate EPCs in the **Table 3 RME series of Attachment K-1.**

1.3.2.2 Exposure Factors

An RME scenario was quantified for potential current and future receptors (EPA, 1989). The exposure factors used **i**n the intake calculations are presented in **Tables 4.1. RME** through **4.8. RME of Attachment K-1.** The primary references for exposure factors are standard default exposure factors presented in EPA guidance (EPA, 1989, 2002, 2004). No default exposure factors have been established for FWS workers; therefore, conservative site-specific exposure factors were established by EPA, PREQB, FWS, and the Navy and presented in the SAP (CH2M HILL, 2011c). The memo sent by FWS to USEPA on February 2, 2010 entitled "Draft Human Health Risk Assessment Scenarios and Exposure Model Parameters for Fish and Wildlife Service Workers in the Eastern Conservation Area" indicates the optimum and likely exposure durations, exposure frequencies, exposure times and number of staff that may be present in various areas of UXO 1 during various future FWS activities, assuming unlimited funding for FWS staff and activities. This summary of potential site-specific activities was developed collaboratively by FWS, USEPA, PREQB, and Navy and was used to identify conservative site-specific exposure factors. Although these site-specific exposure factor values are lower than USEPA's default values, they are expected to be conservative for the anticipated activities for future site-specific workers and visitors.

A site-specific particulate emission factor (PEF) was calculated for use in intake calculations for FWS workers (**Table 4 RME Supplement A of Attachment K-1**). The PEF was calculated using Equation 4-5 and Exhibit D-2 of the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA, 2002). Climate Zone 9 (based on Miami, FL) and a 0.5-acre aerial extent of site contamination were used in the site-specific PEF calculations. The PEF parameter is defined by EPA as the "Areal Extent of Site Contamination," not the site acreage (see **Table 2.1, 2.2., 2.5, 2.6, and 2.7 of Attachment K-1**). It is worth noting that the fraction of vegetative cover was assumed to be 0.5 (i.e., 50 percent) even though the site is vegetated, which is a conservative approach and offsets some of the uncertainty in the PEF value.

In accordance with EPA Region II policy, the dermal exposure route for soil was quantified for constituents with dermal absorption fraction from soil (DABS) values, as presented in Exhibit 3-4 of the EPA's *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual - Part E, Supplemental Guidance for Dermal Risk Assessment* (EPA, 2004). The DABS values that were used in this HHRA are presented in **Table 4 RME Supplement B of Attachment K-1.**

1.4 Toxicity Assessment

The following hierarchy of sources was used to obtain toxicity data for COPCs (EPA, 2003):

- Integrated Risk Information System (IRIS) (EPA, 2011c);
- Provisional Peer-Reviewed Toxicity Values (PPRTVs; EPA, 2008, 2010a); and
- Other Peer-Reviewed Sources (e.g., California Environmental Protection Agency [Cal/EPA] Toxicity Criteria Database [Cal/EPA, 2011]).

Non-cancer toxicity values used in the HHRA are presented in **Tables 5.1 and 5.2 of Attachment K-1**. Cancer toxicity values for COPCs are provided in **Tables 6.1 and 6.2 of Attachment K-1.**

1.4.1 Non-Carcinogenic Toxicity Values

Non-carcinogenic toxicity values (oral reference doses [RfDs] and inhalation reference concentrations [RfCs]) were used in estimating potential adverse health effects associated with exposure to COPCs. Chronic toxicity data for potential non-carcinogenic effects of COPCs are presented in **Tables 5.1 and 5.2 of Attachment K-1**.

1.4.2 Carcinogenic Toxicity Values

Carcinogenic toxicity values (cancer slope factors [CSFs] and inhalation unit risks [IURs]) were used in evaluating potential carcinogenic effects associated with exposure to known, probable, or possible carcinogens having an EPA weight-of-evidence classification of A, B, or C, respectively. CSFs and IURs were used to estimate upper-bound lifetime statistical probabilities of a hypothetical individual developing cancer as a result of exposure to a potential carcinogen. Toxicity data for potential carcinogenic effects for COPCs are presented in **Tables 6.1 and 6.2 of Attachment K-1**.

1.4.3 Derivation of Dermal Toxicity Values

Oral RfDs and CSFs were converted to dermal RfDs and CSFs using an oral-to-dermal adjustment factor. The values used for this conversion were obtained from RAGS Part E Section 4.2 and Exhibit 4-1 (EPA, 2004). Following EPA's recommendation, such a conversion was performed only when a chemical has a gastrointestinal absorption factor of less than 50%. If a chemical-specific gastrointestinal absorption factor was not available, gastrointestinal absorption of the chemical was assumed to be 100% and the oral RfD (or oral CSF) was used as the dermal RfD (or dermal CSF) without adjustment.

1.5 Risk Characterization

Potential human health risks are discussed separately for carcinogenic and non-carcinogenic COPCs due to the different toxicological endpoints, relevant exposure durations, and methods used to estimate risk. EPA Superfund guidance considers an acceptable site ELCR range to be within 1 to 100 in a million ($1x10^{-6}$ to $1x10^{-4}$). Generally, remedial actions are not warranted for site media with an ELCR of $1x10^{-4}$ or below, or a Hazard Index (HI) of 1.0 or less, although it may be warranted if a standard (e.g., maximum contaminant level [MCL]) is exceeded, or if other site-specific information suggests to risk managers that action is appropriate.

1.5.1 Approach for Potential Non-Carcinogenic Effects

The HHRA evaluated the potential for non-carcinogenic effects by comparing exposure intakes of each COPC over a specified time period (chronic) with RfDs derived for similar exposure periods. For the inhalation exposure route, non-carcinogenic effects were evaluated by comparing the exposure concentrations (ECs) of each COPC with its RfC. In EPA methodology, this ratio of exposure to toxicity is referred to as a HQ. The HQ assumes that there is a level of exposure below which it is unlikely for even sensitive populations to experience adverse health effects. If the exposure level exceeds this threshold, there is the potential for non-cancer health effects to occur. The HQ is calculated as follows:

$$HQ = \frac{Intake}{RfD} \quad \text{or} \quad HQ = \frac{Exposure\ \ Concentration}{RfC}$$

Intake and RfD are expressed in the same units (milligram per kilogram per day [mg/kg-day]) and represent the same exposure period (chronic or subchronic). Similarly, ECs and RfCs are expressed in the same units (milligram per cubic meter [mg/m^3]). A HQ that exceeds 1.0 (i.e., intake exceeds the RfD or EC exceeds the RfC) indicates that there is a potential for adverse health effects associated with exposure to that COPC.

To assess the potential for non-carcinogenic health effects posed by exposure to multiple COPCs and exposure routes, an HI approach was used (EPA, 1989). This approach assumes that non-carcinogenic hazards associated with exposure to more than one COPC and exposure route are additive. Synergistic or antagonistic interactions between COPCs are not quantified. The HI may exceed 1.0 even if all of the individual HQs are less than 1.0. The HI is equal to the sum of the HQs and is calculated as follows:

$$HI = \frac{I_1}{RfD_1} + \frac{I_2}{RfD_2} + \ldots \frac{I_i}{RfD_i} + \frac{EC_1}{RfC_1} + \frac{EC_2}{RfC_2} + \ldots \frac{EC_j}{RfC_j}$$

where:

I = Intake level (mg/kg-day)

RfD = Reference dose (mg/kg-day)

I_i = Intake level for the "*i*"th constituent

RfD_i = Reference dose for the "*i*"th constituent

EC = Exposure concentration (mg/m^3)

RfC = Reference concentration (mg/m^3)

EC_j = Exposure concentration for the "*j*"th constituent

$RfCj_i$ = Reference concentration for the "*j*"th constituent

HIs were calculated in a phased approach. Screening HIs were calculated by summing all HQs for a receptor, and final HIs were calculated for each potential receptor by target organ (or critical effect or target system). If a final HI exceeds 1.0, there is a potential for adverse non-carcinogenic effects on that target organ/system or critical effect.

1.5.2 Approach for Potential Carcinogenic Effects

The potential for carcinogenic effects due to exposure to site media was evaluated by estimating the ELCR. The ELCR is the incremental increase in the probability of developing cancer during one's lifetime (as a result of exposure to site media) above the probability of developing cancer from non-site exposures.

Potential ELCRs associated with exposure to individual carcinogens were calculated using CSFs and chronic daily intakes (CDIs) for oral and dermal contact exposures and IURs and ECs for inhalation exposures. The linear low-dose equation was used to estimate the incremental probability of an individual developing cancer over a lifetime as a result of exposure to potential carcinogens. Estimated ELCRs are calculated by multiplying the CDI by the CSF or EC by the IUR.

$$ELCR = CDI \times CSF \quad \text{or} \quad ELCR = EC \times IUR$$

where:

ELCR = unitless probability of developing cancer

CDI = chronic daily intake averaged over 70 years

CSF = cancer slope factor

EC = exposure concentration averaged over 70 years

IUR = inhalation unit risk

The theoretical probability of developing cancer as a consequence of exposure to two or more COPCs and by two or more exposure pathways was calculated by summing the risk estimates for each COPC in the appropriate scenarios using the following equations:

$$Total\ ELCR = (I_1 \times CSF_1) + (I_2 \times CSF_2) + \ldots (I_i \times CSF_i) +$$
$$(EC_1 \times IUR_1) + (EC_2 \times IUR_2) + \ldots (EC_i \times IUR_j)$$

where:

I = Intake level (mg/kg-day)

CSF = Cancer slope factor $(mg/kg\text{-}day)^{-1}$

I_i = Intake level for the '*i*'th constituent

CSF_i = Cancer slope factor for the '*i*'th constituent

EC = Exposure concentration [microgram per cubic meter ($\mu g/m^3$)]

IUR = Inhalation unit risk $(\mu g/m^3)^{-1}$

EC_j = Exposure concentration for the 'j'th constituent

IUR_j = Inhalation unit risk for the '*j*'th constituent

1.5.3 Summary of Risk Estimates

Potential exposures to soil, surface water and sediment were quantified for the RME scenarios identified below. The calculated ELCRs and HIs are as follows:

- **FWS Worker #1 – Current/Future Scenario**
  - Site-wide surface soil (ingestion, dermal contact, and inhalation); sediment (ingestion and dermal contact); surface water (dermal contact)
  - $1x10^{-6}$ cumulative ELCR and all target organ-specific HIs<1.0 (**Table 7.1 RME**, summarized in **Table 9.1 RME of Attachment K-1**)
- **FWS Worker #2 – Current/Future Scenario**
  - Bahia Playa Blanca Beach surface soil (ingestion, dermal contact, and inhalation)
  - $5x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0 (**Table 7.2 RME**, summarized in **Table 9.2 RME of Attachment K-1**)
- **FWS Worker #3 – Future Scenario**
  - Uplands surface soil (ingestion, dermal contact, and inhalation)
  - $1x10^{-6}$ cumulative ELCR and all target organ-specific HIs<1.0 (**Table 7.3 RME**, summarized in **Table 9.3 RME of Attachment K-1**)
- **FWS Worker #4 – Future Scenario**
  - Lowlands surface soil (ingestion, dermal contact, and inhalation)
  - $3x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0 (**Table 7.4 RME**, summarized in **Table 9.4 RME of Attachment K-1**)
- **FWS Worker #5 – Future Scenario**
  - Lagoon fringe surface soil (ingestion, dermal contact, and inhalation); sediment (ingestion and dermal contact); surface water (dermal contact)
  - $9x10^{-7}$ cumulative ELCR and all target organ-specific HIs<1.0 (**Table 7.5 RME**, summarized in **Table 9.5 RME of Attachment K-1**)

1.5.4 Summary of Chemicals of Concern

Chemicals of concern (COCs) are identified when the potential ELCR or HI for a receptor group exceeds EPA threshold values (a total ELCR of $1x10^{-4}$ or a target organ-specific HI of 1.0). When a potential ELCR of $1x10^{-4}$ is exceeded for an exposure medium for a receptor group, the COPCs posing an individual ELCR greater than $1x10^{-6}$ in the environmental medium responsible for the unacceptable risks are identified as COCs. When a potential target organ-specific HI exceeds 1.0 for an exposure medium for a receptor group, the COPCs posing a HQ greater than 0.10 for that target organ in the environmental medium responsible for the unacceptable HI are identified as COCs. ELCR and HI estimates for site soil, sediment, and surface water exposures are within EPA acceptable levels for all receptor groups. Therefore, no chemicals were identified as COCs.

1.5.5 Uncertainty Analysis

The assumptions used in the HHRA have inherent uncertainty. While it is theoretically possible that this leads to underestimates of potential risk, the use of numerous upper-bound assumptions most likely results in conservative estimates of potential risk. A receptor group's potential exposure and subsequent potential risk are influenced by the exposure scenario and dose/response and vary on a case-by-case basis. The key assumptions in the HHRA and their influence on the numerical risk estimates are presented in the table below. Additionally, specific uncertainties associated with the HHRA for ECA are discussed below.

Exposure to subsurface soil was not evaluated in the HHRA because subsurface soil (depths greater than 2 feet) is not present at UXO 1 except at the Bahia Playa Blanca Beach and the Lagoon Fringe area and the potential receptors at the site would not likely be exposed to subsurface soil. Subsurface soil is generally not present in other areas (uplands and lowlands) due to the shallow depth of bedrock, although there may be some small areas where subsurface soil exists. FWS workers performing conservation activities are expected to contact surface soil only, including deeper surface soil up to 24 inches bgs. Due to the relatively inaccessible location of UXO 1 and its location within a National Wildlife Refuge, future excavation activities below 2 feet (e.g., those associated with invasive activities during site development, regarding, or construction) on the site are highly unlikely. FWS workers involved in tree planting as part of vegetation restoration may occasionally encounter locations where subsurface soil is present, but the frequency would be very seldom and the planting depths (based on observed soil profiles and likely sizes of vegetation planted) would not likely be deeper than 2 feet. Therefore, the exclusion of subsurface soil from the evaluation is not expected to impact the conclusions drawn during the HHRA or to underestimate risks from potential exposure to soil.

In this HHRA, the 95% UCL concentrations and/or maximum detected concentrations of sample grouping comprised of both discrete and composite samples were selected as EPCs for the COPC (arsenic) in soil. Although these two sample types present site concentrations differently (i.e., incremental samples represent average concentrations, while discrete samples represent concentrations in a smaller spatial area), using the 95% UCLs or maximum detected concentrations as EPCs will likely lead to an overestimation of actual exposure because receptors are assumed to be exposed to the 95% UCL or maximum detected concentration for the entire exposure duration. Thus, the assumption that all potential exposures are to the 95% UCL or maximum detected concentration likely results in an overestimation of actual exposures and estimates of potential risk. Additionally, the Master HHRA Protocol does not provide exposure factors for the specific receptors at ECA (FWS Workers) and the RME scenarios on which exposure estimates were calculated were specifically selected with high exposure frequency and high soil contact activities such as planting and digging. Therefore the exposure intensity assumptions used in this HHRA are expected to be very conservative. A RME scenario results in upper-bound exposure estimates and likely overestimates actual site exposures. For these reasons, any actual risks are likely to be less than the potential risks presented in this HHRA.

An external review draft of the IRIS Toxicological Review of Inorganic Arsenic was published in 2010 and includes a draft CSF that is approximately one order of magnitude higher than the CSF used in this HHRA (EPA, 2010b). Therefore, there is uncertainty in the CSF used in this HHRA and the resulting risk estimates. However, if the draft CSF were adopted in the future, the risk estimates for UXO 1 would be approximately 1 order of magnitude higher than those presented in this HHRA and still within the EPA acceptable risk range. Further, as discussed in Section 4 (Nature and Extent of Contamination), arsenic is not likely associated with a site-related release.

Major Uncertainties in the Human Health Risk Assessment

Category	Methodology	Probable Effect on Risk Estimates
DATA EVALUATION		
Selection of COPCs	Inorganic chemicals detected in exposure media at concentrations below background levels were retained as COPCs.	Site-related risks are overestimated
EXPOSURE ASSUMPTIONS		
Use of conservative exposure assumptions	A generic PEF based on 50% vegetative cover was calculated to estimate site ambient air concentrations; however, most of the site has more than 50% vegetative cover which would result in lower ambient air concentrations.	Overestimates risks
Use of conservatively estimated EPCs	The 95% UCL on the arithmetic mean and maximum detected concentrations were used as EPCs in soil.	Overestimates risks
TOXICITY ASSESSMENT		
Revised Toxicity Values	The CSF for inorganic arsenic is currently under review by EPA and is expected to increase.	Underestimates risk
RISK CHARACTERIZATION		
Risk from multiple chemicals	Assumes additivity of risks from multiple chemicals; chemical mixtures may actually have synergistic or antagonistic effects.	Under- or overestimates risks
Combination of several upper-bound assumptions	Various upper-bound exposure and toxicity assumptions are combined.	Overestimates risks.

1.6 References

California EPA (Cal/EPA). 2011. *Toxicity Criteria Database*. Office of Environmental Health Hazard Assessment. [Online]. Available: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

CH2M HILL. 2010. *Master Standard Operating Procedures, Protocols, and Plans*, Environmental Restoration Program, Vieques, Puerto Rico. February.

CH2M HILL. 2011a. Human Health Risk Assessment Pre-Interim Deliverable for UXO 1 (RAGS Part D Tables 1 through 3). June.

CH2M HILL. 2011b. *Interim Deliverable for the Human Health Risk Assessment – RAGS Part D Tables – Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico.* September.

CH2M HILL. 2011c. *Remedial Investigation Sampling and Analysis Plan Eastern Conservation Area Former Vieques Naval Training Range*, Environmental Restoration Program, Vieques, Puerto Rico. January.

Department of the Navy. 1979. *Draft Environmental Impact Statement: Volume I – Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range (Vieques).* December.

U.S. Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A).* Office of Emergency and Remedial Response. EPA/540/1-89/002. December

EPA. 1991. *Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors.* Interim Final. OSWER Directive 9285.6-03.

EPA. 2001. *Risk Assessment Guidance for Superfund (RAGS); Volume I - Human Health Evaluation Manual* (Part D, Standardized Planning, Reporting and Review of Superfund Risk Assessments). Final. December.

EPA. 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.* Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

EPA. 2003. *Human Health Toxicity Values in Superfund Risk Assessments*. OSWER Directive 9285.7-53. December 5.

EPA. 2004. *Risk Assessment Guidance for Superfund, Volume I: HHEM (Part E, Supplemental Guidance for Dermal Risk Assessment).* Final. EPA/540/R-99/005. July.

EPA. 2008. *Provisional Peer Reviewed Toxicity Values for Cobalt (CASRN 7440-48-4).* Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. August 25.

EPA. 2009a. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters .* Office of Solid Waste and Emergency Response. June.

EPA. 2009b. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment).* EPA-540-R-070-002. OSWER 9285.7.82. January.

EPA. 2010a. *Provisional Peer Reviewed Toxicity Values for Thallium and Compounds Metallic Thallium (7440-28-0), Thallium (I) acetate (563-68-8), Thallium (I) carbonate (6533-73-9), Thallium (I) chloride (7791-12-0), Thallium (I) nitrate (10102-45-1), Thallium (I) oxide (1314-12-1), Thallium (III) oxide (1314-32-5), Thallium (I) selenite (12039-52-0), and Thallium (I) sulfate (7446-18-6).* Superfund Health Risk Technical Support Center. National Center for Environmental Assessment. October 8.

EPA. 2010b. *Toxicological Review of Inorganic Arsenic. In Support of Summary Information on the Integrated Risk Information System (IRIS).* EPA/635/R-10/001. February.

EPA. 2011a. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. [Online]. Available: http://www.epa.gov/region09/waste/sfund/prg/index.html. June.

EPA. 2011b. *ProUCL Version 4.00.005*. Prepared by Lockheed Martin Environmental Services. February. Available at http://www.epa.gov/esd/tsc/TSC_form.htm

EPA. 2011c. *Integrated Risk Information System (IRIS) Database*. [Online]. Available: http://www.epa.gov/iris/index.html

Attachment K-1
RAGS Part D Tables

TABLE 1

SELECTION OF EXPOSURE PATHWAYS

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Soil	Surface Soil (0-2 feet)	Bahia Playa Blanca Beach [b] Soil	FWS Worker #2	Adult	Ingestion, Dermal, Inhalation	On-Site	Quant	FWS Sea Turtle Monitoring Workers may contact surface soil and deeper surface soil while conducting sea turtle monitoring and conservation activities.
			Site-Wide Soil	FWS Worker #1	Adult	Ingestion, Dermal, Inhalation	On-Site	Quant	FWS Wildlife Survey and Monitoring Workers may contact surface soil while conducting site-wide wildlife surveillance and monitoring.
				FWS Law Enforcement Workers	Adult	Ingestion, Dermal, Inhalation	On-Site	Qual	FWS Law Enforcement Workers conducting emergency or infrequent response activities are expected to have insignificant exposure to site-wide soil based on the nature of the activities they are conducting and the short term duration of their activities. Risk estimates for FWS Workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of Law Enforcement Worker risks.
				Trespassers	Adult, Youth, Child	Ingestion, Dermal, Inhalation	On-Site	Qual	The ECA is a National Wildlife Refuge that is closed to the public[c]. Trespassers are unlikely to access the site due to the inaccessible nature of the site: the site is remote, it is only accessible through the LIA (which is a Congressionally-mandated Wilderness Area where public access is not permitted), the roads that access the site are rough and unpaved, and there are numerous locked gates and fences that must be opened to reach the site. The site cannot be accessed via boat or small craft due to the shallow reef and cliff elevation. FWS Workers are present on the site and would arrest and remove trespassers from the site if discovered there. Land crab from the ECA are a very small (or zero) percentage of a trespasser's diet due to the inaccessibility of the site. Risk estimates for FWS Workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of trespasser risks.
		Land Crab	Land Crab Around the Lagoon [a]	Trespassers	Adult, Youth, Child	Ingestion	On-Site	Qual	
		Surface Soil (0-1 foot)	Light Post (Including Battery Disposal Area) Soil	Coast Guard Workers	Adult	Ingestion, Dermal, Inhalation	On-Site	Qual	Coast Guard Workers are expected to have insignificant exposure to site soil based on the nature and short duration of maintenance activities (annually changing the light bulb and battery) at the "Light Post" area. Risk estimates for FWS Workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of Coast Guard Worker risks.
	Sediment	Sediment	Lagoon Sediment	FWS Worker #1	Adult	Ingestion, Dermal	On-Site	Quant	FWS Wildlife Survey and Monitoring Workers may contact sediment while conducting surveillance and monitoring of migratory water fowl; FWS workers enter the lagoon approximately 15 percent of the time they are onsite. Lagoon sediment is too soft to support body weight, but may become available for contact by adhering to kayaks, oars and wader boots. Workers will not enter the lagoon without wearing waders.
	Surface Water	Surface Water	Lagoon Surface Water	FWS Worker #1	Adult	Dermal	On-Site	Quant	FWS Wildlife Survey and Monitoring Workers may contact surface water while conducting surveillance and monitoring of migratory water fowl. FWS workers enter the lagoon approximately 15 percent of the time they are onsite. Surface water may be contacted when workers wade at the edge of the lagoon or during the entry and exiting of kayaks. Workers will not enter the lagoon without waders.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil	Surface Soil (0-1.5 feet)	Uplands Soil	FWS Worker #3	Adult	Ingestion, Dermal, Inhalation	On-Site	Quant	FWS ECA Upland Dry Forest Restoration Workers may contact surface soil while conducting restoration, surveillance and monitoring of the Uplands.
		Surface Soil (0-1 foot)	Lowlands Soil	FWS Worker #4	Adult	Ingestion, Dermal, Inhalation	On-Site	Quant	FWS ECA Lowland Forest Restoration Workers may contact surface soil while conducting restoration, surveillance and monitoring of the Lowlands.
		Surface Soil (0-2 feet)	Lagoon Fringe Soil [(a)]	FWS Worker #5	Adult	Ingestion, Dermal, Inhalation	On-Site	Quant	FWS Migratory Waterfowl Survey Workers may contact surface soil while conducting surveillance and monitoring of migratory water fowl.
	Sediment	Sediment	Lagoon Sediment	FWS Worker #5	Adult	Ingestion, Dermal	On-Site	Quant	FWS Migratory Waterfowl Survey and Monitoring Workers may contact sediment while conducting surveillance and monitoring of migratory water fowl. Lagoon sediment is too soft to support body weight, but may become available for contact by adhering to kayaks, oars and wader boots. Workers will not enter the lagoon without wearing waders.
	Surface Water	Surface Water	Lagoon Surface Water	FWS Worker #5	Adult	Dermal	On-Site	Quant	FWS Migratory Waterfowl Survey and Monitoring Workers may contact surface water while conducting surveillance and monitoring of migratory water fowl. Surface water may be contacted when workers wade at the edge of the lagoon or during the entry and exiting of kayaks. Workers will not enter the lagoon without waders.

Note:
ECA = Eastern Conservation Area
FWS = Fish and Wildlife Service
LIA = Live Impact Area

(a) The area designated "Lagoon" extends 10 meters inland from the shoreline.

(b) The area designated Bahia Playa Blanca extends 20 meters inland from the edge of the vegetation to encompass the entire area in which sea turtles are known to travel to nest and lay eggs.

(c) ECA was transferred to the Department of the Interior to be managed by the FWS as a National Wildlife Refuge and access to the public is not planned nor likely (via trespassing).

TABLE 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #1)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (4)
Site-Wide Soil	99-35-4	1,3,5-Trinitrobenzene	1.20E-02	N,J	1.20E-02	N,J	mg/kg	VEECA-4DU05	1 / 33	9.20E-03 - 1.00E-02	1.20E-02	NA	2.70E+03	nc	NA	NA	NO	BSL
	118-96-7	2,4,6-Trinitrotoluene	2.60E-02	N,J	2.60E-02	N,J	mg/kg	VEECA-4DU07	1 / 35	1.80E-02 - 2.00E-02	2.60E-02	NA	4.20E+01	nc	NA	NA	NO	BSL
	618-87-1	3,5-Dinitroaniline	1.30E-02	J	1.30E-02	J	mg/kg	VEECA-4DU15	1 / 35	8.10E-03 - 9.00E-03	1.30E-02	NA	--	--	NA	NA	NO	NTX
	2691-41-0	HMX	2.70E-02	N,J	2.70E-02	N,J	mg/kg	VEECA-4DU05	1 / 35	1.10E-02 - 1.20E-02	2.70E-02	NA	4.90E+03	nc	NA	NA	NO	BSL
	14797-73-0	Perchlorate	2.70E-04	J	1.60E-03	J	mg/kg	VEECA-4DU04	10 / 35	2.40E-04 - 3.30E-04	1.60E-03	NA	7.20E+01	nc	NA	NA	NO	BSL
	479-45-8	Tetryl	4.00E-02	J	4.00E-02	J	mg/kg	VEECA-2SB03	1 / 35	9.20E-03 - 1.00E-02	4.00E-02	NA	2.50E+02	nc	NA	NA	NO	BSL
	7429-90-5	Aluminum	5.35E+02		3.71E+04	J	mg/kg	VEECA-4SS01	36 / 36	6.30E+00 - 2.80E+01	3.71E+04	5.82E+04	9.90E+04	nc	NA	NA	NO	BSL
	7440-36-0	Antimony	1.50E+00	J	1.50E+00	J	mg/kg	VEECA-4SS01	1 / 36	1.00E+00 - 4.70E+00	1.50E+00	NA	4.10E+01	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	1.70E+00	J	3.61E+01		mg/kg	VEECA-4DU02	29 / 36	1.70E-01 - 1.50E+00	3.61E+01	8.47E+00	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	7.00E+00	J	7.32E+01		mg/kg	VEECA-3DU01	36 / 36	1.30E-01 - 6.00E-01	7.32E+01	1.20E+02	1.90E+04	nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	1.30E-01	J	9.70E-01	J	mg/kg	VEECA-4DU15	21 / 36	3.30E-02 - 1.50E-01	9.70E-01	1.16E+00	2.00E+02	nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	6.00E-02	J	4.60E-01	J	mg/kg	VEECA-4DU09	18 / 36	3.30E-02 - 1.50E-01	4.60E-01	2.99E-01	8.00E+01	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	2.63E+04		3.38E+05		mg/kg	VEECA-3SB04	36 / 36	2.25E+01 - 5.97E+01	3.38E+05	5.95E+04	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	6.20E+00		6.59E+01		mg/kg	VEECA-4SS01	36 / 36	1.60E-01 - 7.00E-01	6.59E+01	7.94E+01	1.50E+05	nc	NA	NA	NO	BSL
	7440-48-4	Cobalt	3.60E-01	J	1.25E+01		mg/kg	VEECA-4DU05	31 / 36	2.80E-01 - 1.20E+00	1.25E+01	1.12E+01	3.00E+01	nc	NA	NA	NO	BSL
	7440-50-8	Copper	1.10E+00	J	2.48E+01		mg/kg	VEECA-4DU05	34 / 36	2.50E-01 - 1.10E+00	2.48E+01	2.46E+01	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	7.58E+02		3.83E+04		mg/kg	VEECA-4SS01	36 / 36	1.20E+00 - 6.40E+00	3.83E+04	4.89E+04	7.20E+04	nc	NA	NA	NO	BSL
	7439-92-1	Lead	1.30E+00	J	5.61E+01	J	mg/kg	VEECA-4SS01	15 / 36	2.90E-01 - 2.60E+00	5.61E+01	1.72E+01	8.00E+02	ALM	NA	NA	NO	BSL
	7439-95-4	Magnesium	5.43E+03		1.65E+04		mg/kg	VEECA-4DU02	36 / 36	5.00E+00 - 2.25E+01	1.65E+04	6.54E+03	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	2.85E+01		8.38E+02		mg/kg	VEECA-4DU15	36 / 36	2.80E-01 - 1.50E+00	8.38E+02	1.04E+03	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	4.90E-01	J	1.77E+01		mg/kg	VEECA-4SS01	32 / 36	2.70E-01 - 1.20E+00	1.77E+01	2.30E+01	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	1.69E+02	J	7.17E+03		mg/kg	VEECA-4DU15	36 / 36	1.12E+01 - 5.00E+01	7.17E+03	7.90E+03	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	4.00E-01		2.70E+00		mg/kg	VEECA-4SS01	26 / 36	1.10E-01 - 1.00E+00	2.70E+00	1.31E+00	5.10E+02	nc	NA	NA	NO	BSL
	7440-22-4	Silver	1.20E-01	J	1.20E-01	J	mg/kg	VEECA-4SB01	1 / 36	1.00E-01 - 4.50E-01	1.20E-01	NA	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	2.25E+02	J	8.57E+03	J	mg/kg	VEECA-3DU02	36 / 36	1.23E+01 - 5.50E+01	8.57E+03	3.38E+02	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	5.60E-02	J	2.70E-01		mg/kg	VEECA-4SS01	5 / 36	5.60E-02 - 5.00E-01	2.70E-01	NA	1.00E+00	nc	NA	NA	NO	BSL
	7440-62-2	Vanadium	3.90E+00	J	7.14E+01		mg/kg	VEECA-4DU05	36 / 36	2.10E-01 - 9.50E-01	7.14E+01	7.17E+01	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	2.50E+00	J	6.38E+01		mg/kg	VEECA-2DU04	34 / 36	2.10E-01 - 9.50E-01	6.38E+01	3.42E+01	3.10E+04	nc	NA	NA	NO	BSL
	98-95-3	Nitrobenzene	9.80E-02	N,J	9.80E-02	N,J	mg/kg	VEECA-4DU03	1 / 14	1.70E-02 - 1.80E-02	9.80E-02	NA	2.40E+01	ca	NA	NA	NO	BSL
	18540-29-9	Chromium (hexavalent)	6.70E-02	J	6.70E-02	J	mg/kg	VEECA-4SS01	1 / 36	1.00E-02 - 5.80E-02	6.70E-02	NA	5.60E+00	ca	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Eastern Conservation Area background upper tolerance level for surface soil.

(3) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

No screening level is available for 3,5-Dinitroaniline.
The SL for 'Cadmium (diet)' was used as the SL for Cadmium.
The SL for 'Chromium III' was used as the SL for Chromium.
The SL for Lead is based on the USEPA lead working group.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(4) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)
No Toxicity Information (NTX)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
ALM = Adult Lead Methodology
FWS = Fish and Wildlife Service
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
N = tentatively identified compound
NA = Not available
SL = Screening Level

TABLE 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #2)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (4)
Bahia Playa Blanca Beach Soil	7429-90-5	Aluminum	3.80E+02	J	5.75E+02		mg/kg	VEECA-1DU01	4 / 4	5.70E+00 - 2.80E+01	5.75E+02	5.82E+04	9.90E+04	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	1.70E+00	J	1.70E+00	J	mg/kg	VEECA-1DU01	1 / 4	1.50E+00 - 3.90E+00	1.70E+00	8.47E+00	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	6.10E+00		7.10E+00	J	mg/kg	VEECA-1DU01	4 / 4	1.20E-01 - 6.00E-01	7.10E+00	1.20E+02	1.90E+04	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	3.12E+05		3.24E+05		mg/kg	VEECA-1DU02	4 / 4	2.30E+01 - 4.50E+01	3.24E+05	5.95E+04	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	6.80E+00	J	7.00E+00		mg/kg	VEECA-1SB01	4 / 4	1.40E-01 - 7.00E-01	7.00E+00	7.94E+01	1.50E+05	nc	NA	NA	NO	BSL
	7440-50-8	Copper	6.60E-01	J	1.10E+00	J	mg/kg	VEECA-1DU01	3 / 4	2.30E-01 - 1.10E+00	1.10E+00	2.46E+01	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	6.75E+02		7.63E+02		mg/kg	VEECA-1DU01	4 / 4	5.50E+00 - 5.70E+00	7.63E+02	4.89E+04	7.20E+04	nc	NA	NA	NO	BSL
	7439-95-4	Magnesium	1.39E+04	J	1.55E+04		mg/kg	VEECA-1DU02	4 / 4	4.60E+00 - 2.25E+01	1.55E+04	6.54E+03	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	2.48E+01		2.97E+01		mg/kg	VEECA-1DU01	4 / 4	1.20E+00 - 1.30E+00	2.97E+01	1.04E+03	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	2.60E-01	J	3.00E-01	J	mg/kg	VEECA-1SB01	2 / 4	2.50E-01 - 1.20E+00	3.00E-01	2.30E+01	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	1.07E+02		1.77E+02	J	mg/kg	VEECA-1DU02	4 / 4	1.02E+01 - 5.00E+01	1.77E+02	7.90E+03	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	2.20E+00	J	2.20E+00	J	mg/kg	VEECA-1DU01	1 / 4	1.00E+00 - 2.60E+00	2.20E+00	1.31E+00	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	2.16E+03	J	2.65E+03	J	mg/kg	VEECA-1DU02	4 / 4	1.13E+01 - 5.50E+01	2.65E+03	3.38E+02	NUT	--	NA	NA	NO	NUT
	7440-62-2	Vanadium	3.40E+00		3.90E+00	J	mg/kg	VEECA-1DU01, VEECA-1DU02	4 / 4	1.90E-01 - 9.50E-01	3.90E+00	7.17E+01	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	5.70E-01	J	6.90E-01	J	mg/kg	VEECA-1SB01	2 / 4	1.90E-01 - 9.50E-01	6.90E-01	3.42E+01	3.10E+04	nc	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Eastern Conservation Area background upper tolerance level for surface soil.

(3) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

The SL for 'Chromium III' was used as the SL for Chromium.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(4) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
NA = Not available
SL = Screening Level

TABLE 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future and Future
Medium: Sediment
Exposure Medium: Sediment (Fish and Wildlife Service Worker #1 and #5)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (2)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (3)
Lagoon Sediment	7429-90-5	Aluminum	7.18E+03		2.00E+04		mg/kg	VEECA-5SD05	15 / 15	7.30E+00 - 1.11E+01	2.00E+04	NA	9.90E+04	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	1.60E+00	J	3.30E+00	J	mg/kg	VEECA-5SD01	13 / 15	9.80E-01 - 1.50E+00	3.30E+00	NA	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	1.62E+01		4.84E+01		mg/kg	VEECA-5SD14	15 / 15	1.60E-01 - 2.40E-01	4.84E+01	NA	1.90E+04	nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	5.40E-02	J	1.10E-01	J	mg/kg	VEECA-5SD09	10 / 15	3.90E-02 - 5.90E-02	1.10E-01	NA	2.00E+02	nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	4.60E-02	J	1.60E-01	J	mg/kg	VEECA-5SD01, VEECA-5SD09	14 / 15	3.90E-02 - 5.90E-02	1.60E-01	NA	8.00E+01	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	1.63E+05		2.60E+05		mg/kg	VEECA-5SD04	15 / 15	2.94E+01 - 4.46E+01	2.60E+05	NA	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	1.77E+01		3.55E+01		mg/kg	VEECA-5SD05	15 / 15	1.80E-01 - 2.80E-01	3.55E+01	NA	1.50E+05	nc	NA	NA	NO	BSL
	7440-48-4	Cobalt	3.80E+00		8.30E+00		mg/kg	VEECA-5SD09	15 / 15	3.30E-01 - 5.00E-01	8.30E+00	NA	3.00E+01	nc	NA	NA	NO	BSL
	7440-50-8	Copper	8.90E+00		2.59E+01		mg/kg	VEECA-5SD09	15 / 15	2.90E-01 - 4.40E-01	2.59E+01	NA	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	8.18E+03		1.82E+04		mg/kg	VEECA-5SD01	15 / 15	1.40E+00 - 2.20E+00	1.82E+04	NA	7.20E+04	nc	NA	NA	NO	BSL
	7439-95-4	Magnesium	8.75E+03		1.79E+04		mg/kg	VEECA-5SD05	15 / 15	5.90E+00 - 8.90E+00	1.79E+04	NA	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	2.74E+02		5.71E+02		mg/kg	VEECA-5SD05	15 / 15	3.30E-01 - 5.00E-01	5.71E+02	NA	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	4.80E+00		1.08E+01		mg/kg	VEECA-5SD09	15 / 15	3.10E-01 - 4.80E-01	1.08E+01	NA	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	1.73E+03		6.49E+03		mg/kg	VEECA-5SD09	15 / 15	1.31E+01 - 1.98E+01	6.49E+03	NA	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	7.50E-01	J	2.70E+00		mg/kg	VEECA-5SD05	15 / 15	6.50E-01 - 9.90E-01	2.70E+00	NA	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	3.03E+03		1.88E+04		mg/kg	VEECA-5SD01	15 / 15	1.44E+01 - 2.18E+01	1.88E+04	NA	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	8.10E-02	J	8.10E-02	J	mg/kg	VEECA-5SD05	1 / 15	6.50E-02 - 9.90E-02	8.10E-02	NA	1.00E+00	nc	NA	NA	NO	BSL
	7440-62-2	Vanadium	2.70E+01		6.23E+01		mg/kg	VEECA-5SD15	15 / 15	2.50E-01 - 3.80E-01	6.23E+01	NA	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	1.24E+01		2.84E+01		mg/kg	VEECA-5SD01	15 / 15	2.50E-01 - 3.80E-01	2.84E+01	NA	3.10E+04	nc	NA	NA	NO	BSL
	18540-29-9	Chromium (hexavalent)	1.90E-02	J	1.90E-02	J	mg/kg	VEECA-5SD14, VEECA-5SD15	2 / 15	1.30E-02 - 2.00E-02	1.90E-02	NA	5.60E+00	ca	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

The SL for 'Cadmium (diet)' was used as the SL for Cadmium.
The SL for 'Chromium III' was used as the SL for Chromium.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(3) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
NA = Not available
SL = Screening Level

TABLE 2.4.RME
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future and Future
Medium: Surface Water
Exposure Medium: Surface Water (Fish and Wildlife Service Worker #1 and #5)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (2)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (3)
Lagoon Surface Water	7429-90-5	Aluminum	2.01E+03	J	2.99E+03	J	ug/L	VEECA-5SW03	5 / 5	4.80E+02 - 4.80E+02	2.99E+03	NA	3.70E+03	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	1.40E+00	J	2.00E+00	J	ug/L	VEECA-5SW01	5 / 5	1.00E+00 - 1.00E+00	2.00E+00	NA	4.50E-02	ca	10	WQS	YES	ASL
	7440-39-3	Barium	6.76E+01	J	7.24E+01	J	ug/L	VEECA-5SW03	5 / 5	2.50E+01 - 2.50E+01	7.24E+01	NA	7.30E+02	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	5.97E+05		6.22E+05		ug/L	VEECA-5SW01	5 / 5	5.00E+02 - 5.00E+02	6.22E+05	NA	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	4.20E+00	J	7.50E+00		ug/L	VEECA-5SW03	5 / 5	1.50E+00 - 1.50E+00	7.50E+00	NA	5.50E+03	nc	100	WQS	NO	BSL
	7440-48-4	Cobalt	2.80E+00	J	3.10E+00		ug/L	VEECA-5SW01	5 / 5	1.00E+00 - 1.00E+00	3.10E+00	NA	1.10E+00	nc	NA	NA	YES	ASL
	7440-50-8	Copper	1.12E+01		1.21E+01		ug/L	VEECA-5SW04	5 / 5	1.00E+00 - 1.00E+00	1.21E+01	NA	1.50E+02	nc	1300	WQS	NO	BSL
	7439-89-6	Iron	1.91E+03		2.53E+03		ug/L	VEECA-5SW03	5 / 5	2.50E+01 - 2.50E+01	2.53E+03	NA	2.60E+03	nc	NA	NA	NO	BSL
	7439-95-4	Magnesium	6.86E+05		7.08E+05		ug/L	VEECA-5SW01	5 / 5	4.00E+02 - 4.00E+02	7.08E+05	NA	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	5.71E+01	J	7.75E+01	J	ug/L	VEECA-5SW03	5 / 5	2.50E+01 - 2.50E+01	7.75E+01	NA	8.80E+01	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	1.50E+00	J	3.60E+00		ug/L	VEECA-5SW02	3 / 4	1.00E+00 - 1.00E+00	3.60E+00	NA	7.30E+01	nc	610	WQS	NO	BSL
	7440-09-7	Potassium	1.86E+05		1.93E+05		ug/L	VEECA-5SW01	5 / 5	9.30E+02 - 9.30E+02	1.93E+05	NA	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	2.90E+00	J	1.70E+01		ug/L	VEECA-5SW01	2 / 4	1.00E+00 - 2.00E+00	1.70E+01	NA	1.80E+01	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	5.57E+06	J	5.74E+06	J	ug/L	VEECA-5SW04	5 / 5	2.50E+03 - 2.50E+03	5.74E+06	NA	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	5.40E-01	J	7.00E-01	J	ug/L	VEECA-5SW04	2 / 5	5.00E-01 - 5.00E-01	7.00E-01	NA	3.70E-02	nc	0.24	WQS	YES	ASL
	7440-62-2	Vanadium	1.13E+01	J	1.40E+01		ug/L	VEECA-5SW01	5 / 5	3.00E+00 - 3.00E+00	1.40E+01	NA	1.80E+01	nc	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Tapwater (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using HQ=0.1.

The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Chromium (III)' was used as the SL for Chromium.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.

(3) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
NA = Not available
SL = Screening Level
WQS = Water Quality Standard from the Puerto Rico Water Quality Standards Regulations (March, 2010). The protection for the water body or aquatic life for reasons of human health was provided.

TABLE 2.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1.5 feet)(Fish and Wildlife Service Worker #3)

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (4)
Uplands Soil	99-35-4	1,3,5-Trinitrobenzene	1.20E-02	N,J	1.20E-02	N,J	mg/kg	VEECA-4DU05	1 / 15	9.20E-03 - 1.00E-02	1.20E-02	NA	2.70E+03	nc	NA	NA	NO	BSL
	118-96-7	2,4,6-Trinitrotoluene	2.60E-02	N,J	2.60E-02	N,J	mg/kg	VEECA-4DU07	1 / 16	1.80E-02 - 2.00E-02	2.60E-02	NA	4.20E+01	nc	NA	NA	NO	BSL
	618-87-1	3,5-Dinitroaniline	1.30E-02	J	1.30E-02	J	mg/kg	VEECA-4DU15	1 / 16	8.10E-03 - 9.00E-03	1.30E-02	NA	--	--	NA	NA	NO	NTX
	2691-41-0	HMX	2.70E-02	N,J	2.70E-02	N,J	mg/kg	VEECA-4DU05	1 / 16	1.10E-02 - 1.20E-02	2.70E-02	NA	4.90E+03	nc	NA	NA	NO	BSL
	14797-73-0	Perchlorate	8.10E-04	J	1.60E-03	J	mg/kg	VEECA-4DU04	6 / 16	2.40E-04 - 3.30E-04	1.60E-03	NA	7.20E+01	nc	NA	NA	NO	BSL
	7429-90-5	Aluminum	7.70E+03		3.71E+04	J	mg/kg	VEECA-4SS01	17 / 17	6.50E+00 - 2.80E+01	3.71E+04	5.82E+04	9.90E+04	nc	NA	NA	NO	BSL
	7440-36-0	Antimony	1.50E+00	J	1.50E+00	J	mg/kg	VEECA-4SS01	1 / 17	1.10E+00 - 4.70E+00	1.50E+00	NA	4.10E+01	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	5.40E+00		3.61E+01		mg/kg	VEECA-4DU02	17 / 17	7.50E-01 - 1.50E+00	3.61E+01	8.47E+00	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	1.55E+01		4.42E+01		mg/kg	VEECA-4SS01	17 / 17	1.40E-01 - 6.00E-01	4.42E+01	1.20E+02	1.90E+04	nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	1.80E-01	J	9.70E-01	J	mg/kg	VEECA-4DU15	15 / 17	3.50E-02 - 1.50E-01	9.70E-01	1.16E+00	2.00E+02	nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	9.20E-02	J	4.60E-01	J	mg/kg	VEECA-4DU09	12 / 17	3.50E-02 - 1.50E-01	4.60E-01	2.99E-01	8.00E+01	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	2.63E+04		2.82E+05		mg/kg	VEECA-4SB01	17 / 17	2.25E+01 - 2.87E+01	2.82E+05	5.95E+04	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	2.25E+01		6.59E+01		mg/kg	VEECA-4SS01	17 / 17	1.60E-01 - 7.00E-01	6.59E+01	7.94E+01	1.50E+05	nc	NA	NA	NO	BSL
	7440-48-4	Cobalt	4.10E+00	J	1.25E+01		mg/kg	VEECA-4DU05	17 / 17	2.90E-01 - 1.20E+00	1.25E+01	1.12E+01	3.00E+01	nc	NA	NA	NO	BSL
	7440-50-8	Copper	1.21E+01		2.48E+01		mg/kg	VEECA-4DU05	17 / 17	2.60E-01 - 1.10E+00	2.48E+01	2.46E+01	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	1.18E+04		3.83E+04		mg/kg	VEECA-4SS01	17 / 17	1.40E+00 - 6.40E+00	3.83E+04	4.89E+04	7.20E+04	nc	NA	NA	NO	BSL
	7439-92-1	Lead	1.30E+00	J	5.61E+01	J	mg/kg	VEECA-4SS01	12 / 17	3.00E-01 - 1.70E+00	5.61E+01	1.72E+01	8.00E+02	ALM	NA	NA	NO	BSL
	7439-95-4	Magnesium	5.43E+03		1.65E+04		mg/kg	VEECA-4DU02	17 / 17	5.30E+00 - 2.25E+01	1.65E+04	6.54E+03	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	3.21E+02	J	8.38E+02		mg/kg	VEECA-4DU15	17 / 17	3.20E-01 - 1.50E+00	8.38E+02	1.04E+03	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	6.00E+00		1.77E+01		mg/kg	VEECA-4SS01	17 / 17	2.80E-01 - 1.20E+00	1.77E+01	2.30E+01	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	2.00E+03		7.17E+03		mg/kg	VEECA-4DU15	17 / 17	1.18E+01 - 5.00E+01	7.17E+03	7.90E+03	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	5.00E-01	J	2.70E+00		mg/kg	VEECA-4SS01	15 / 17	5.00E-01 - 1.00E+00	2.70E+00	1.31E+00	5.10E+02	nc	NA	NA	NO	BSL
	7440-22-4	Silver	1.20E-01	J	1.20E-01	J	mg/kg	VEECA-4SB01	1 / 17	1.10E-01 - 4.50E-01	1.20E-01	NA	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	2.25E+02	J	3.87E+03	J	mg/kg	VEECA-4SB01	17 / 17	1.28E+01 - 5.50E+01	3.87E+03	3.38E+02	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	2.70E-01		2.70E-01		mg/kg	VEECA-4SS01	1 / 17	5.80E-02 - 5.00E-01	2.70E-01	NA	1.00E+00	nc	NA	NA	NO	BSL
	7440-62-2	Vanadium	3.36E+01		7.14E+01		mg/kg	VEECA-4DU05	17 / 17	2.20E-01 - 9.50E-01	7.14E+01	7.17E+01	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	1.80E+01		4.24E+01		mg/kg	VEECA-4DU09	17 / 17	2.20E-01 - 9.50E-01	4.24E+01	3.42E+01	3.10E+04	nc	NA	NA	NO	BSL
	98-95-3	Nitrobenzene	9.80E-02	N,J	9.80E-02	N,J	mg/kg	VEECA-4DU03	1 / 7	1.70E-02 - 1.80E-02	9.80E-02	NA	2.40E+01	ca	NA	NA	NO	BSL
	18540-29-9	Chromium (hexavalent)	6.70E-02	J	6.70E-02	J	mg/kg	VEECA-4SS01	1 / 17	1.00E-02 - 5.80E-02	6.70E-02	NA	5.60E+00	ca	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Eastern Conservation Area background upper tolerance level for surface soil.

(3) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

No screening level is available for 3,5-Dinitroaniline.
The SL for 'Antimony (metallic)' was used as the SL for Antimony.
The SL for 'Cadmium (diet)' was used as the SL for Cadmium.
The SL for 'Chromium III' was used as the SL for Chromium.
The SL for Lead is based on the USEPA lead working group.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(4) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)
No Toxicity Information (NTX)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
ALM = Adult Lead Methodology
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
N = tentatively identified compound
NA = Not available
SL = Screening Level

TABLE 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1 foot)(Fish and Wildlife Service Worker #4

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (4)
Lowlands Soil	14797-73-0	Perchlorate	3.10E-04	J	4.00E-04	J	mg/kg	VEECA-2DU02	3 / 7	2.40E-04 - 3.00E-04	4.00E-04	NA	7.20E+01	nc	NA	NA	NO	BSL
	479-45-8	Tetryl	4.00E-02	J	4.00E-02	J	mg/kg	VEECA-2SB03	1 / 7	9.50E-03 - 9.90E-03	4.00E-02	NA	2.50E+02	nc	NA	NA	NO	BSL
	7429-90-5	Aluminum	1.03E+03		2.32E+04		mg/kg	VEECA-2DU03	7 / 7	6.30E+00 - 2.80E+01	2.32E+04	5.82E+04	9.90E+04	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	3.90E+00		2.17E+01		mg/kg	VEECA-2SB03	6 / 7	1.70E-01 - 1.50E+00	2.17E+01	8.47E+00	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	7.90E+00	J	4.93E+01		mg/kg	VEECA-2DU03	7 / 7	1.30E-01 - 6.00E-01	4.93E+01	1.20E+02	1.90E+04	nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	1.60E-01	J	2.50E-01	J	mg/kg	VEECA-2DU03	4 / 7	3.40E-02 - 1.50E-01	2.50E-01	1.16E+00	2.00E+02	nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	6.00E-02	J	2.80E-01	J	mg/kg	VEECA-2DU03	5 / 7	3.40E-02 - 1.50E-01	2.80E-01	2.99E-01	8.00E+01	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	7.35E+04		2.85E+05		mg/kg	VEECA-2DU02	7 / 7	2.25E+01 - 5.21E+01	2.85E+05	5.95E+04	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	6.20E+00		4.97E+01	J	mg/kg	VEECA-2DU03	7 / 7	1.60E-01 - 7.00E-01	4.97E+01	7.94E+01	1.50E+05	nc	NA	NA	NO	BSL
	7440-48-4	Cobalt	2.00E+00	J	1.10E+01		mg/kg	VEECA-2DU03	6 / 7	2.80E-01 - 1.20E+00	1.10E+01	1.12E+01	3.00E+01	nc	NA	NA	NO	BSL
	7440-50-8	Copper	8.80E+00	J	2.21E+01		mg/kg	VEECA-2DU03	6 / 7	2.50E-01 - 1.10E+00	2.21E+01	2.46E+01	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	1.44E+03		2.67E+04		mg/kg	VEECA-2DU03	7 / 7	1.20E+00 - 5.50E+00	2.67E+04	4.89E+04	7.20E+04	nc	NA	NA	NO	BSL
	7439-92-1	Lead	1.30E+00		9.80E+00		mg/kg	VEECA-2DU04	3 / 7	2.90E-01 - 1.30E+00	9.80E+00	1.72E+01	8.00E+02	ALM	NA	NA	NO	BSL
	7439-95-4	Magnesium	6.88E+03	J	1.00E+04		mg/kg	VEECA-2DU02	7 / 7	5.10E+00 - 2.25E+01	1.00E+04	6.54E+03	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	4.63E+01		6.51E+02		mg/kg	VEECA-2DU03	7 / 7	2.80E-01 - 1.20E+00	6.51E+02	1.04E+03	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	4.00E+00	J	1.49E+01		mg/kg	VEECA-2DU03	6 / 7	2.70E-01 - 1.20E+00	1.49E+01	2.30E+01	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	2.93E+02	J	4.99E+03		mg/kg	VEECA-2DU03	7 / 7	1.12E+01 - 5.00E+01	4.99E+03	7.90E+03	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	6.30E-01		1.20E+00	J	mg/kg	VEECA-2DU01	6 / 7	1.10E-01 - 1.00E+00	1.20E+00	1.31E+00	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	3.81E+02	J	2.15E+03	J	mg/kg	VEECA-2DU02	7 / 7	1.23E+01 - 5.50E+01	2.15E+03	3.38E+02	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	5.60E-02	J	1.00E-01	J	mg/kg	VEECA-2SB03	2 / 7	5.60E-02 - 5.00E-01	1.00E-01	NA	1.00E+00	nc	NA	NA	NO	BSL
	7440-62-2	Vanadium	4.00E+00	J	6.67E+01		mg/kg	VEECA-2DU03	7 / 7	2.10E-01 - 9.50E-01	6.67E+01	7.17E+01	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	2.50E+00	J	6.38E+01		mg/kg	VEECA-2DU04	7 / 7	2.10E-01 - 9.50E-01	6.38E+01	3.42E+01	3.10E+04	nc	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Eastern Conservation Area background upper tolerance level for surface soil.

(3) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

The SL for 'Cadmium (diet)' was used as the SL for Cadmium.
The SL for 'Chromium III' was used as the SL for Chromium.
The SL for Lead is based on the USEPA lead working group.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(4) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
ALM = Adult Lead Methodology
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
NA = Not available
SL = Screening Level

TABLE 2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #5)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (3)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Selection or Deletion (4)
Lagoon Fringe Soil	14797-73-0	Perchlorate	2.70E-04	J	2.70E-04	J	mg/kg	VEECA-3DU01	1 / 10	2.50E-04 - 3.30E-04	2.70E-04	NA	7.20E+01	nc	NA	NA	NO	BSL
	7429-90-5	Aluminum	9.75E+02		2.02E+04		mg/kg	VEECA-3SB03	10 / 10	6.30E+00 - 2.80E+01	2.02E+04	5.82E+04	9.90E+04	nc	NA	NA	NO	BSL
	7440-38-2	Arsenic	1.90E+00	J	1.35E+01		mg/kg	VEECA-3SB02	5 / 10	1.80E-01 - 1.50E+00	1.35E+01	8.47E+00	1.60E+00	ca	NA	NA	YES	ASL
	7440-39-3	Barium	8.10E+00		7.32E+01		mg/kg	VEECA-3DU01	10 / 10	1.30E-01 - 6.00E-01	7.32E+01	1.20E+02	1.90E+04	nc	NA	NA	NO	BSL
	7440-41-7	Beryllium	1.30E-01	J	1.80E-01	J	mg/kg	VEECA-3SB03	2 / 10	3.30E-02 - 1.50E-01	1.80E-01	1.16E+00	2.00E+02	nc	NA	NA	NO	BSL
	7440-43-9	Cadmium	6.30E-02	J	6.30E-02	J	mg/kg	VEECA-3SB04	1 / 10	3.30E-02 - 1.50E-01	6.30E-02	2.99E-01	8.00E+01	nc	NA	NA	NO	BSL
	7440-70-2	Calcium	1.08E+05		3.38E+05		mg/kg	VEECA-3SB04	10 / 10	2.25E+01 - 5.97E+01	3.38E+05	5.95E+04	NUT	--	NA	NA	NO	NUT
	7440-47-3	Chromium	6.60E+00		3.75E+01		mg/kg	VEECA-3SB03	10 / 10	1.60E-01 - 7.00E-01	3.75E+01	7.94E+01	1.50E+05	nc	NA	NA	NO	BSL
	7440-48-4	Cobalt	3.60E-01	J	9.10E+00		mg/kg	VEECA-3SB03	8 / 10	2.80E-01 - 1.20E+00	9.10E+00	1.12E+01	3.00E+01	nc	NA	NA	NO	BSL
	7440-50-8	Copper	2.20E+00		2.03E+01		mg/kg	VEECA-3SB03	10 / 10	2.50E-01 - 1.10E+00	2.03E+01	2.46E+01	4.10E+03	nc	NA	NA	NO	BSL
	7439-89-6	Iron	1.56E+03		2.15E+04		mg/kg	VEECA-3SB03	10 / 10	1.20E+00 - 5.50E+00	2.15E+04	4.89E+04	7.20E+04	nc	NA	NA	NO	BSL
	7439-95-4	Magnesium	6.31E+03	J	1.04E+04	J	mg/kg	VEECA-3SB04, VEECA-3SB05	10 / 10	5.00E+00 - 2.25E+01	1.04E+04	6.54E+03	NUT	--	NA	NA	NO	NUT
	7439-96-5	Manganese	4.67E+01		5.37E+02		mg/kg	VEECA-3SB03	10 / 10	2.80E-01 - 1.20E+00	5.37E+02	1.04E+03	2.30E+03	nc	NA	NA	NO	BSL
	7440-02-0	Nickel	4.90E-01	J	1.12E+01		mg/kg	VEECA-3SB03	9 / 10	2.70E-01 - 1.20E+00	1.12E+01	2.30E+01	2.00E+03	nc	NA	NA	NO	BSL
	7440-09-7	Potassium	2.40E+02		4.50E+03		mg/kg	VEECA-3SB02	10 / 10	1.12E+01 - 5.00E+01	4.50E+03	7.90E+03	NUT	--	NA	NA	NO	NUT
	7782-49-2	Selenium	4.00E-01		7.00E-01		mg/kg	VEECA-3SB01	4 / 10	1.10E-01 - 1.00E+00	7.00E-01	1.31E+00	5.10E+02	nc	NA	NA	NO	BSL
	7440-23-5	Sodium	2.72E+03		8.57E+03	J	mg/kg	VEECA-3DU02	10 / 10	1.23E+01 - 5.50E+01	8.57E+03	3.38E+02	NUT	--	NA	NA	NO	NUT
	7440-28-0	Thallium	7.70E-02	J	9.30E-02	J	mg/kg	VEECA-3SB02	2 / 10	5.60E-02 - 5.00E-01	9.30E-02	NA	1.00E+00	nc	NA	NA	NO	BSL
	7440-62-2	Vanadium	4.40E+00		6.67E+01		mg/kg	VEECA-3SB03	10 / 10	2.10E-01 - 9.50E-01	6.67E+01	7.17E+01	5.20E+02	nc	NA	NA	NO	BSL
	7440-66-6	Zinc	3.00E+00	J	2.64E+01	J	mg/kg	VEECA-3SB03	10 / 10	2.10E-01 - 9.50E-01	2.64E+01	3.42E+01	3.10E+04	nc	NA	NA	NO	BSL

(1) Maximum concentration is used for screening.

(2) Eastern Conservation Area background upper tolerance level for surface soil.

(3) Regional Screening Levels for Industrial Soil (June 2011). Concentrations based on non-carcinogenic health effects are adjusted using an HQ=0.1.

The SL for 'Cadmium (diet)' was used as the SL for Cadmium.
The SL for 'Chromium III' was used as the SL for Chromium.
The SL for 'Manganese Non-diet' was used as the SL for Manganese.
The SL for 'Nickel Soluble Salts' was used as the SL for Nickel.
The SL for 'Vanadium and compounds' was used as the SL for Vanadium.
The SL for 'Zinc and compounds' was used as the SL for Zinc.

(4) Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

ca = Carcinogenic
nc = Noncarcinogenic
HQ = Hazard Quotient
J = compound was detected below the reporting limit in the sample
NA = Not available
SL = Screening Level

Table 3.1.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #1)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Site-Wide Soil	Arsenic	mg/kg	1.1E+01	1.2E+01	3.6E+01	1.2E+01	mg/kg	95% KM (BCA)	(4)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate exposure point concentration, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the Max.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.

Table 3.2.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #2)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)	Maximum Concentration (Qualifier)		Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Bahia Playa Blanca Beach Soil	Arsenic	mg/kg	NA	NA	1.7E+00	J	1.7E+00	mg/kg	Maximum Detected Concentration	(1)

(1) The maximum detected concentration was used for this chemical because there was only 1 detected result.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.
J = compound was detected below the reporting limit in the sample
NA = not applicable/not available

Table 3.3.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future and Future
Medium: Sediment
Exposure Medium: Sediment (Fish and Wildlife Service Worker #1 and #5)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)	Maximum Concentration (Qualifier)		Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Lagoon Sediment	Arsenic	mg/kg	2.3E+00	2.5E+00	3.3E+00	J	2.5E+00	mg/kg	95% KM (t)	(4)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate exposure point concentration, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the maximum detected concentration.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.
J = compound was detected below the reporting limit in the sample

Table 3.4.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future and Future
Medium: Surface Water
Exposure Medium: Surface Water (Fish and Wildlife Service Worker #1 and #5)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
								Value	Units	Statistic	Rationale
Lagoon Surface Water	Arsenic	ug/L	1.7E+00	1.9E+00	N	2.0E+00	J	1.9E+00	ug/L	95% Student's-t	(2)
	Cobalt	ug/L	3.0E+00	3.1E+00	N	3.1E+00		3.1E+00	ug/L	95% Student's-t	(2)
	Thallium	ug/L	6.2E-01	7.9E-01		7.0E-01	J	7.0E-01	ug/L	Maximum Detected Concentration	(5)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate RME EPC, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the maximum detected concentration.

ug/L = micrograms/liter
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.
J = compound was detected below the reporting limit in the sample

Table 3.5.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1.5 feet)(Fish and Wildlife Service Worker #3)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic	Rationale
Uplands Soil	Arsenic	mg/kg	1.4E+01	1.8E+01	G	3.6E+01	1.8E+01	mg/kg	95% Approximate Gamma	(3)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate exposure point concentration, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the maximum detected concentration.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.

Table 3.6.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1 foot)(Fish and Wildlife Service Worker #4)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Lowlands Soil	Arsenic	mg/kg	9.27E+00	1.31E+01	2.2E+01	1.3E+01	mg/kg	95% KM (BCA)	(4)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate RME EPC, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the maximum detected concentration.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.

Table 3.7.RME
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)(Fish and Wildlife Service Worker #5)

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (N/T/G)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Lagoon Fringe Soil	Arsenic	mg/kg	6.2E+00	6.4E+00	1.4E+01	6.4E+00	mg/kg	95% KM (t)	(4)

ProUCL, Version 4.1.00 used to determine distribution of data using the Shapiro-Wilk W Test. ProUCL used to calculate exposure point concentration, following recommendations based on distribution and standard deviation in users guide (EPA. February 2011. ProUCL, Version 4.1.00. Prepared by Lockheed Martin Environmental Services).

(1) Shapiro-Wilk W/Lilliefors Test indicates data are log-normally distributed.
(2) Shapiro-Wilk W/Lilliefors Test indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) The maximum detected concentration was used as the EPC because the value recommended by ProUCL was higher than the maximum detected concentration.

mg/kg= milligrams/kilogram
G = Gamma distribution.
N = Normal distribution.
T = Log-normal distribution.

TABLE 4.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil (0-2 feet)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	FWS Worker #1	Adult	Site-Wide Soil **Activity:** Wildlife Surveillance and Monitoring	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	100	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	35	days/year	2 days/week, 4 months/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #2	Adult	Bahia Playa Blanca Beach Soil **Activity:** Sea Turtle Monitoring and Conservation	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	100	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	130	days/year	3 days/week, 10 months/year (2)	
				ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 6 hours per work day.
Dermal	FWS Worker #1	Adult	Site-Wide Soil **Activity:** Wildlife Surveillance and Monitoring	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	35	days/year	2 days/week, 4 months/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #2	Adult	Bahia Playa Blanca Beach Soil **Activity:** Sea Turtle Monitoring and Conservation	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	130	days/year	3 days/week, 10 months/year (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 6 hours per work day.

Notes:
ECA = Eastern Conservation Area
FWS = Fish and Wildlife Service
RME = Reasonable Maximum Exposure
(1) The typical Vieques maintenance worker soil ingestion rate was selected to represent FWS Worker activities not involving planting; the typical Vieques construction worker soil ingestion rate was selected to represent FWS Worker planting activities.
(2) Exposure duration and exposure frequency selected during the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA.
(3) Calculated as the product of ED (years) x 365 days/year.
(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.
(5) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.
(6) The typical Vieques maintenance worker soil-to-skin adherence factor was selected to represent FWS Worker activities not involving planting; the typical Vieques construction worker soil-to-skin adherence factor was selected to represent FWS Worker planting activities.

Sources:
EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.
EPA, 2004. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual. Part E Supplemental Guidance for Dermal Risk Assessment).

cm^2 = Square centimeter
kg = Kilogram
kg/mg = Kilogram per milligram
mg/kg = Milligram per kilogram
mg/kg-day = Milligram per kilogram per day
mg/cm^2-day = Milligram per square centimeter per day
mg/day = Milligram per day

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	FWS Worker #1	Adult	Emissions from Site-wide Soil **Activity:** Wildlife Surveillance and Monitoring	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	Exposure Concentration (EC) (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	10	hr/day	(1)	
				EF	Exposure Frequency	35	days/year	2 days/week, 4 months/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	25	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	
	FWS Worker #2	Adult	Emissions from Soil at Bahia Playa Blanca Beach **Activity:** Sea Turtle Monitoring	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	Exposure Concentration (EC) (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	6	hr/day	(1)	
				EF	Exposure Frequency	130	days/year	3 days/week, 10 months/year (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	25	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor 1	1/24	day/hr	- -	

Notes:

ECA = Eastern Conservation Area

FWS = Fish and Wildlife Service

(1) Exposure duration, exposure frequency, and exposure time selected during the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(2) Calculated as the product of ED (years) x 365 days/year.

(3) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

mg/kg = Milligram per kilogram

mg/m^3 = Milligram per cubic meter

m^3/kg = Cubic meter per kilogram

TABLE 4.3.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	FWS Worker #1	Adult	Lagoon Sediment	CSed	Chemical Concentration in Sediment	See Table 3s RME	mg/kg	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
			Activity:	IR-Sed	Ingestion Rate of Sediment	10	mg/day	(1)	CSed x IR-Sed x EF x ED x CF x 1/BW x 1/AT
			Surveillance and Monitoring	EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (2)	
			of Migratory Waterfowl	ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to lagoon sediment for 4 hours per work day.
Dermal	FWS Worker #1	Adult	Lagoon Sediment	CSed	Chemical Concentration in Sediment	See Table 3s RME	mg/kg	See Table 3s RME	CDI (mg/kg-day) =
			Activity:	SA	Skin Surface Area Available for Contact	2,500	cm^2	(5)	CSed x SA x SSAF x DABS x CF x EF x
			Surveillance and Monitoring	SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004	ED x 1/BW x 1/AT
			of Migratory Waterfowl	DABS	Dermal Absorption Factor Solids	Chemical specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to lagoon sediment for 4 hours per work day.

Note:

FWS = Fish and Wildlife Service

(1) IR-Sed assumed to be 10% of soil ingestion rate.

(2) Exposure frequency and duration selected during Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(3) Calculated as the product of ED (years) x 365 days/year.

(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

(5) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

EPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

TABLE 4.4.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	FWS Worker #1	Adult	Lagoon Surface Water	CW	Chemical Concentration in Water	See Table 3s RME	µg/l	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
			Activity:	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm^2-event	Calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
			Surveillance and Monitoring	K_p	Permeability Coefficient	Chemical-Specific	cm/hr	EPA, 2004	
			of Migratory Waterfowl	t_{event}	Event Duration	4	hr/event	(1)	Inorganics: DAevent (mg/cm^2-event) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	(2)	Kp x CW x t_{event} x CF1 x CF2
				EV	Event Frequency	1	events/day	EPA, 2004	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (1)	
				ED	Exposure Duration	25	years	(1)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	
				CF1	Conversion Factor 1	0.001	mg/µg	- -	
				CF2	Conversion Factor 2	0.001	l/cm^3	- -	

Notes:

(1) Exposure duration, exposure frequency, and exposure time selected during Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(2) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.

(3) Calculated as the product of ED (years) x 365 days/year.

(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

EPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

TABLE 4.5.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	FWS Worker #5	Adult	Lagoon Sediment	CSed	Chemical Concentration in Sediment	See Table 3s RME	mg/kg	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
			Activity:	IR-Sed	Ingestion Rate of Sediment	10	mg/day	(1)	CSed x IR-Sed x EF x ED x CF x 1/BW x 1/AT
			Surveillance and Monitoring	EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (2)	
			of Migratory Waterfowl	ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to lagoon sediment for 4 hours per work day.
Dermal	FWS Worker #5	Adult	Lagoon Sediment	CSed	Chemical Concentration in Sediment	See Table 3s RME	mg/kg	See Table 3s RME	CDI (mg/kg-day) =
			Activity:	SA	Skin Surface Area Available for Contact	2,500	cm^2	(5)	CSed x SA x SSAF x DABS x CF x EF x
			Surveillance and Monitoring	SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004	ED x 1/BW x 1/AT
			of Migratory Waterfowl	DABS	Dermal Absorption Factor Solids	Chemical specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-C	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to lagoon sediment for 4 hours per work day.

Note:

FWS = Fish and Wildlife Service

(1) IR-Sed assumed to be 10% of soil ingestion rate.

(2) Exposure frequency and duration selected during Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(3) Calculated as the product of ED (years) x 365 days/year.

(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

(5) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

EPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

TABLE 4.6.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	FWS Worker #5	Adult	Lagoon Surface Water	CW	Chemical Concentration in Water	See Table 3s RME	µg/l	See Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
			Activity:	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm^2-event	Calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
			Surveillance and Monitoring	K_p	Permeability Coefficient	Chemical-Specific	cm/hr	EPA, 2004	
			of Migratory Waterfowl	t_{event}	Event Duration	4	hr/event	(1)	Inorganics: DAevent (mg/cm^2-event) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	(2)	Kp x CW x t_{event} x CF1 x CF2
				EV	Event Frequency	1	events/day	EPA, 2004	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/year (1)	
				ED	Exposure Duration	25	years	(1)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	
				CF1	Conversion Factor 1	0.001	mg/µg	- -	
				CF2	Conversion Factor 2	0.001	l/cm^3	- -	

Notes:

(1) Exposure duration, exposure frequency, and exposure time selected during Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(2) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.

(3) Calculated as the product of ED (years) x 365 days/year.

(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

EPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005.

TABLE 4.7.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1 foot; 0-1.5 feet; 0-2 feet)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	FWS Worker #3	Adult	Uplands Soil **Activity:** Dry Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	100	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	10	days/year	5 days/week, 2 weeks/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #3	Adult	Uplands Soil **Activity:** Dry Forest Restoration (Planting)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	330	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	30	days/year	5 days/week, 6 weeks/yr (2)	
				ED	Exposure Duration	5	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #4	Adult	Lowlands Soil **Activity:** Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	100	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	3	days/year	3 days/week, 1 week/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	assumed to be exposed to site soil for 8 hours per work day.
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	
	FWS Worker #4	Adult	Lowlands Soil **Activity:** Forest Restoration (Planting)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	330	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	9	days/year	3 days/week, 3 weeks/yr (2)	
				ED	Exposure Duration	5	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(3)	assumed to be exposed to site soil for 8 hours per work day.
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	
	FWS Worker #5	Adult	Lagoon Fringe **Activity:** Surveillance and Monitoring of Migratory Waterfowl	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				IR-S	Ingestion Rate of Soil	100	mg/day	EPA, 2002 (1)	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 4 hours per work day.

TABLE 4.7.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1 foot; 0-1.5 feet; 0-2 feet)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal	FWS Worker #3	Adult	Uplands Soil **Activity:** Dry Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	10	days/year	5 days/week, 2 weeks/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #3	Adult	Uplands Soil **Activity:** Dry Forest Restoration (Planting)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	30	days/year	5 days/week, 6 weeks/yr (2)	
				ED	Exposure Duration	5	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 10 hours per work day.
	FWS Worker #4	Adult	Lowlands Soil **Activity:** Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	3	days/year	3 days/week, 1 week/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	assumed to be exposed to site soil for 8 hours per work day.
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	
	FWS Worker #4	Adult	Lowlands Soil **Activity:** Forest Restoration (Planting)	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	9	days/year	3 days/week, 3 weeks/yr (2)	
				ED	Exposure Duration	5	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	Although it is not included in the CDI equation, workers are
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(3)	assumed to be exposed to site soil for 8 hours per work day.
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	

TABLE 4.7.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface Soil (0-1 foot; 0-1.5 feet; 0-2 feet)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Dermal (cont.)	FWS Worker #5	Adult	Lagoon Fringe Soil **Activity:** Surveillance and Monitoring of Migratory Waterfowl	CS	Chemical Concentration in Soil	Table 3s RME	mg/kg	Table 3s RME	CDI (mg/kg-day) =
				SA	Skin Surface Area Available for Contact	2,500	cm^2	EPA, 2004 (5)	CS x SA x SSAF x DABS x CF x EF x
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm^2-day	EPA, 2004 (6)	ED x 1/BW x 1/AT
				DABS	Dermal Absorption Factor Solids	Chemical-Specific	--	EPA, 2004	
				CF	Conversion Factor	0.000001	kg/mg	- -	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/yr (2)	
				ED	Exposure Duration	25	years	(2)	
				BW	Body Weight	70	kg	EPA, 2002	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(3)	Although it is not included in the CDI equation, workers are
				AT-C	Averaging Time (Cancer)	25,550	days	(4)	assumed to be exposed to site soil for 4 hours per work day.

Notes:

ECA = Eastern Conservation Area

FWS = Fish and Wildlife Service

RME = Reasonable Maximum Exposure

(1) The typical Vieques maintenance worker soil ingestion rate was selected to represent FWS Worker activities not involving planting; the typical Vieques construction worker soil ingestion rate was selected to represent FWS Worker planting activities.

(2) Exposure duration and exposure frequency selected during the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA.

(3) Calculated as the product of ED (years) x 365 days/year.

(4) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

(5) Per the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at the ECA, workers are required to wear a Health and Safety Level D work uniform. Therefore their SA will be based on lower arms, hands, and face.

(6) The typical Vieques maintenance worker soil-to-skin adherence factor was selected to represent FWS Worker activities not involving planting; the typical Vieques construction worker soil-to-skin adherence factor was selected to represent FWS Worker planting activities.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

EPA, 2004. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual. Part E Supplemental Guidance for Dermal Risk Assessment).

cm^2 = Square centimeter

kg = Kilogram

kg/mg = Kilogram per milligram

mg/kg = Milligram per kilogram

mg/kg-day = Milligram per kilogram per day

mg/cm^2-day = Milligram per square centimeter per day

mg/day = Milligram per day

TABLE 4.8.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	FWS Worker #3	Adult	Emissions from Uplands Soil **Activity:** Dry Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	Exposure Concentration (EC) (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	10	hr/day	(1)	
				EF	Exposure Frequency	10	days/year	5 days/week, 2 weeks/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	25	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	
	FWS Worker #3	Adult	Emissions from Uplands Soil **Activity:** Dry Forest Restoration (Planting)	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	EC (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	10	hr/day	(1)	
				EF	Exposure Frequency	30	days/year	5 days/week, 6 weeks/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	5	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	
	FWS Worker #4	Adult	Emissions from Lowlands Soil **Activity:** Forest Restoration (Surveillance and Monitoring)	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	EC (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	8	hr/day	(1)	
				EF	Exposure Frequency	3	days/year	3 days/week, 1 week/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	25	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	

TABLE 4.8.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Ambient Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation (cont.)	FWS Worker #4	Adult	Emissions from Lowlands Soil **Activity:** Forest Restoration (Planting)	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	EC (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	8	hr/day	(1)	
				EF	Exposure Frequency	9	days/year	3 days/week, 3 weeks/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	5	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	1,825	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	
	FWS Worker #5	Adult	Emissions from Lagoon Fringe Soil **Activity:** Surveillance and Monitoring of Migratory Waterfowl	CS	Chemical Concentration in Soil	See Table 3s RME	mg/kg	See Table 3s RME	EC (mg/m^3) =
				CA	Chemical Concentration in Air	Calculated	mg/m^3	EPA, 2002	CA x ET x EF x ED x CF x 1/AT
				PEF	Particulate Emission Factor	7.99E+08	m^3/kg	see Table 4 Supp A	
				ET	Exposure Time	4	hr/day	(1)	
				EF	Exposure Frequency	52	days/year	3 days/week, 4 months/yr (1)	CA (mg/m^3) = CS (1/PEF)
				ED	Exposure Duration	25	years	(1)	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	(2)	
				AT-C	Averaging Time (Cancer)	25,550	days	(3)	
				CF	Conversion Factor	1/24	day/hr	- -	

Notes:

ECA = Eastern Conservation Area

FWS = Fish and Wildlife Service

(1) Exposure duration, exposure frequency, and exposure time selected during the Navy/EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA.

(2) Calculated as the product of ED (years) x 365 days/year.

(3) Calculated as the product of 70 years assumed human lifetime x 365 days/year.

Sources:

EPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24.

mg/kg = Milligram per kilogram

mg/m^3 = Milligram per cubic meter

m^3/kg = Cubic meter per kilogram

TABLE 4 Supplement
BODY PART-SPECIFIC SURFACE AREA CALCULATIONS (ADULTS)
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Surface Area of Adults (50th percentile[3]) (cm^2)			
Body Part	**Male**	**Female**	**Average**
Face[1]	433	370	402
Forearms[2]	1310	1035	1173
Hands	990	817	904
Head	1299	1110	1206

Receptor	SA (cm^2)	Assumed Exposed Body Part
FWS Worker (ECA-specific) =	2500	SA includes face, hands, and forearms.

SA = Surface Area
ECA = Eastern Conservation Area
Note:
1. Face SA was assumed to be 1/3 of head SA.
2. Assumed forearm-to-arm ratio (0.45) for an adult.
3. Obtained from RAGS E Exhibit C-1 - Body Part-Specific Surface Area Calculations (EPA, 2004).

EPA, 2004. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual. Part E Supplemental Guidance for Dermal Risk Assessment).

TABLE 4 RME Supplement A
Particulate Emission Factor - FWS Worker
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

PEF Equations:

$$Q/C_{wind} = A \times \exp\left[\frac{(\ln A_{site} - B)^2}{C}\right]$$

Exhibit D-2 (USEPA, 2002)

$$PEF = Q/C_{wind} \times \frac{3{,}600 \text{sec/hr}}{0.036 \times (1-V) \times \left(U_m/U_t\right)^3 \times F(x)}$$

Equation 4-5 (USEPA, 2002)

PEF and Box Model Input Parameters

Parameter	Definition	Value	Units	Source
Q/C_{wind}	inverse ratio of the geometric mean air concentration to the emission flux at the center of a square source	**75**	m	calculated
A	Constant for Zone 9 (Miami, FL)	12.1960	unitless	Exhibit D-2 (EPA, 2002)
B	Constant for Zone 9 (Miami, FL)	19.0645	unitless	Exhibit D-2 (EPA, 2002)
C	Constant for Zone 9 (Miami, FL)	215.3923	unitless	Exhibit D-2 (EPA, 2002)
A_{site}	Areal extent of site contamination	0.5	acres	site-specific
PEF	particulate emission factor	**7.99E+08**	m^3/kg	calculated
V	fraction of vegetative cover	0.5	unitless	Default (Eqn. 4-5)
Um	mean annual windspeed	5.19	m/s	Note 1 (Dept. of Navy, 1979)
Ut	equivalent threshold value of windspeed at 7 m	11.32	m/s	Default (Eqn. 4-5)
F(x)	function dependent on Um/Ut derived using Cowherd et al. (1985)	0.194	unitless	Default (Eqn. 4-5)

Note 1 - The daily average windspeed from measurements at Observation Post 5 on Vieques (10.1 knots = 5.19 m/s) was used.

Sources:

Department of the Navy. 1979. Draft Environmental Impact Statement: Volume I – Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range (Vieques). December.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, EPA Office of Solid Waste and Emergency Response. OSWER 9355.4-24. December.

TABLE 4 RME Supplement B
DERMAL ABSORPTION FRACTION FROM SOIL
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical Group	CAS Number	Chemical	Dermal Absorption Fraction	Note
Metal	7440-38-2	Arsenic	0.03	USEPA, 2004

Notes:
Dermal Absorption Fraction was obtained from EPA RAGS Part E Exhibit 3-4 (USEPA, 2004)

Sources:
USEPA, 2004: Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual.
(Part E, Supplemental Guidance for Dermal Risk Assessment (Final). EPA/540/R/99/005. July 2004.

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic	3.0E-04	mg/kg-day	95%	3.0E-04	mg/kg-day	Skin	3 / 1	IRIS	6/17/2011
Cobalt	Chronic	3.0E-04	mg/kg-day	100%	3.0E-04	mg/kg-day	Thyroid	3000	PPRTV (3)	6/15/2011
Thallium	Chronic	1.0E-05	mg/kg-day	100%	1.0E-05	mg/kg-day	Hair follicle atrophy	3000	PPRTV (3)	6/15/2011

Note:

(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1. USEPA recommends that the oral RfD should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%. Constituents that do not have oral absorption efficiencies reported on this table were assumed to have an oral absorption efficiency of 100%.

(2) Adjusted based on RAGS Part E.

(3) As cited in Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, June 2011).

Definitions: IRIS = Integrated Risk Information System
PPRTV = Provisional Peer-Reviewed Toxicity Value

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	Chronic	1.5E-05	mg/m^3	Cardiovascular, Nervous, Development	NA	Cal/EPA (1)	6/15/2011
Cobalt (2)	NA	NA	NA	NA	NA	NA	NA
Thallium (2)	NA	NA	NA	NA	NA	NA	NA

Definitions:
Cal/EPA = California Environmental Protection Agency
NA = Not Available

(1) As cited in Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, June 2011).

(2) Chemical was identified as a COPC in surface water and will not be assessed for inhalation exposures. Therefore, inhalation toxicity values are not presented for the COPC, if applicable.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	95%	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	6/17/2011
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA

(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1. USEPA recommends that the oral slope factor should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%. Constituents that do not have oral absorption efficiencies reported on this table were assumed to have an oral absorption efficiency of 100%.
(2) Adjusted based on RAGS Part E.

Definitions: IRIS = Integrated Risk Information System
NA = Not Available

Weight of Evidence definitions:
Group A chemicals (known human carcinogens) are agents for which there is sufficient evidence to support the causal association between exposure to the agents in humans and cancer.
Group B1 chemicals (probable human carcinogens) are agents for which there is limited evidence of possible carcinogenicity in humans.
Group B2 chemicals (probable human carcinogens) are agents for which there is sufficient evidence of carcinogenicity in animals but inadequate or a lack of evidence in humans.
Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals and inadequate or a lack of human data.
Group D chemicals (not classifiable as to human carcinogenicity) are agents with inadequate human and animal evidence of carcinogenicity or for which no data are available.
Group E chemicals (evidence of noncarcinogenicity in humans) are agents for which there is no evidence of carcinogenicity from human or animal studies, or both.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description	Inhalation Unit Risk	
	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	A	IRIS	6/17/2011
Cobalt (1)	NA	NA	NA	NA	NA
Thallium (1)	NA	NA	NA	NA	NA

Definitions: NA = Not Available
IRIS = Integrated Risk Information System

(1) Chemical was identified as a COPC in surface water and will not be assessed for inhalation exposures.
Therefore, inhalation toxicity values are not presented for the COPC, if applicable.

Weight of Evidence definitions:

Group A chemicals (known human carcinogens) are agents for which there is sufficient evidence to support the causal association between exposure to the agents in humans and cancer.

Group B1 chemicals (probable human carcinogens) are agents for which there is limited evidence of possible carcinogenicity in humans.

Group B2 chemicals (probable human carcinogens) are agents for which there is sufficient evidence of carcinogenicity in animals but inadequate or a lack of evidence in humans.

Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals and inadequate or a lack of human data.

Group D chemicals (not classifiable as to human carcinogenicity) are agents with inadequate human and animal evidence of carcinogenicity or for which no data are available.

Group E chemicals (evidence of noncarcinogenicity in humans) are agents for which there is no evidence of carcinogenicity from human or animal studies, or both.

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Receptor Population: FWS Worker #1
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-ncncer Hazard nclculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil (0-2 ft)	Site-Wide Soil	Ingestion	Arsenic	1.2E+01	mg/kg	5.9E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	8.9E-07	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	5.5E-03
			Exp. Route Total								8.9E-07					5.5E-03
		Site-Wide Soil	Dermal	Arsenic	1.2E+01	mg/kg	8.9E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	1.3E-07	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	8.3E-04
			Exp. Route Total								1.3E-07					8.3E-04
		Exposure Point Total									1.0E-06					6.4E-03
	Exposure Medium Total										1.0E-06					6.4E-03
	Ambient Air	Emissions from Site-Wide Soil	Inhalation	Arsenic	1.5E-08	mg/m^3	2.2E-10	mg/m^3	4.3E-03	$1/(ug/m^3)$	9.3E-10	6.1E-10	mg/m^3	1.5E-05	mg/m^3	4.1E-05
			Exp. Route Total								9.3E-10					4.1E-05
		Exposure Point Total									9.3E-10					4.1E-05
	Exposure Medium Total										9.3E-10					4.1E-05
Soil Total											1.0E-06					6.4E-03
Sediment	Sediment	Lagoon Sediment	Ingestion	Arsenic	2.5E+00	mg/kg	1.8E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	2.7E-08	5.0E-08	mg/kg-day	3.0E-04	mg/kg-day	1.7E-04
			Exp. Route Total								2.7E-08					1.7E-04
		Lagoon Sediment	Dermal	Arsenic	2.5E+00	mg/kg	2.7E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	4.0E-08	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	2.5E-04
			Exp. Route Total								4.0E-08					2.5E-04
		Exposure Point Total									6.7E-08					4.2E-04
	Exposure Medium Total										6.7E-08					4.2E-04
Sediment Total											6.7E-08					4.2E-04
Surface Water	Surface Water	Lagoon Surface Water	Dermal	Arsenic	1.9E+00	ug/L	1.4E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	2.1E-08	4.0E-08	mg/kg-day	3.0E-04	mg/kg-day	1.3E-04
				Cobalt	3.1E+00	ug/L	8.9E-09	mg/kg-day	NA	NA	NA	2.5E-08	mg/kg-day	3.0E-04	mg/kg-day	8.3E-05
				Thallium	7.0E-01	ug/L	5.1E-09	mg/kg-day	NA	NA	NA	1.4E-08	mg/kg-day	1.0E-05	mg/kg-day	1.4E-03
			Exp. Route Total								2.1E-08					1.6E-03
		Exposure Point Total									2.1E-08					1.6E-03
	Exposure Medium Total										2.1E-08					1.6E-03
Surface Water Total											2.1E-08					1.6E-03
Receptor Total											1.1E-06					8.5E-03

TABLE 7.1.RME SUPPLEMENT A
CALCULATION OF DAEVENT
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Chemical of Potential Concern	Exposure Point Concentration (C_W) (ug/L)	Permeability Coefficient (K_p) (cm/hr)	B (dimensionless)	Lag Time (τ_{event}) (hr/event)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Adult Duration of Event (t_{event}) (hr/event)	Adult DA_{event} (mg/cm^2-event)	Adult Eq
Arsenic	1.9E+00	1.0E-03	NA	NA	NA	NA	4.0	7.8E-09	1
Cobalt	3.1E+00	4.0E-04	NA	NA	NA	NA	4.0	4.9E-09	1
Thallium	7.0E-01	1.0E-03	NA	NA	NA	NA	4.0	2.8E-09	1

Inorganics: DA_{event} (mg/cm^2-event) =

$$DA_{event} = K_p \times C_W \times tevent \times 0.001\ mg/ug \times 0.001\ l/cm^3 \quad \text{(Eq 1)}$$

Notes:

Values for permeability constants, B, tau, t*, and FA are from USEPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005.
NA - Not applicable.
t* - Time to reach steady-state
B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).
CF1 - Conversion Factor 1 (0.001 mg/µg), CF2 - Conversion Factor 2 (0.001 L/cm^3)

TABLE 7.2.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Receptor Population: FWS Worker #2
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-ncncer Hazard nclculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil (0-2 ft)	Bahia Playa Blanca Beach Soil	Ingestion	Arsenic	1.7E+00	mg/kg	3.1E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	4.6E-07	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	2.9E-03
			Exp. Route Total								4.6E-07					2.9E-03
		Bahia Playa Blanca Beach Soil	Dermal	Arsenic	1.7E+00	mg/kg	4.6E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	7.0E-08	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	4.3E-04
			Exp. Route Total								7.0E-08					4.3E-04
		Exposure Point Total									5.3E-07					3.3E-03
	Exposure Medium Total										5.3E-07					3.3E-03
	Ambient Air	Emissions from Bahia Playa Blanca Beach Soil	Inhalation	Arsenic	2.1E-09	mg/m^3	6.8E-11	mg/m^3	4.3E-03	$1/(ug/m^3)$	2.9E-10	1.9E-10	mg/m^3	1.5E-05	mg/m^3	1.3E-05
			Exp. Route Total								2.9E-10					1.3E-05
		Exposure Point Total									2.9E-10					1.3E-05
	Exposure Medium Total										2.9E-10					1.3E-05
Soil Total											5.3E-07					3.3E-03

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #3
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-ncncer Hazard nclculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Dry Forest Restoration Surveillance and Monitoring Risk Calculations															
Soil	Surface Soil (0-1.5 ft)	Uplands Soil	Ingestion	Arsenic	1.8E+01	mg/kg	2.5E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	3.7E-07	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	2.3E-03
			Exp. Route Total								3.7E-07					2.3E-03
		Uplands Soil	Dermal	Arsenic	1.8E+01	mg/kg	3.7E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	5.6E-08	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	3.5E-04
			Exp. Route Total								5.6E-08					3.5E-04
		Exposure Point Total									4.3E-07					2.7E-03
	Exposure Medium Total										4.3E-07					2.7E-03
	Ambient Air	Emissions from Uplands Soil	Inhalation	Arsenic	2.2E-08	mg/m^3	9.1E-11	mg/m^3	4.3E-03	$1/(ug/m^3)$	3.9E-10	2.5E-10	mg/m^3	1.5E-05	mg/m^3	1.7E-05
			Exp. Route Total								3.9E-10					1.7E-05
		Exposure Point Total									3.9E-10					1.7E-05
	Exposure Medium Total										3.9E-10					1.7E-05
	Soil Total for Surveillance and Monitoring										4.3E-07					2.7E-03
	Dry Forest Restoration Planting Calculations															
	Surface Soil (0-1.5 ft)	Uplands Soil	Ingestion	Arsenic	1.8E+01	mg/kg	4.9E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	7.4E-07	6.9E-06	mg/kg-day	3.0E-04	mg/kg-day	2.3E-02
			Exp. Route Total								7.4E-07					2.3E-02
		Uplands Soil	Dermal	Arsenic	1.8E+01	mg/kg	3.3E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	5.0E-08	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	1.6E-03
			Exp. Route Total								5.0E-08					1.6E-03
		Exposure Point Total									7.9E-07					2.4E-02
	Exposure Medium Total										7.9E-07					2.4E-02
	Ambient Air	Emissions from Uplands Soil	Inhalation	Arsenic	2.2E-08	mg/m^3	5.4E-11	mg/m^3	4.3E-03	$1/(ug/m^3)$	2.3E-10	7.6E-10	mg/m^3	1.5E-05	mg/m^3	5.1E-05
			Exp. Route Total								2.3E-10					5.1E-05
		Exposure Point Total									2.3E-10					5.1E-05
	Exposure Medium Total										2.3E-10					5.1E-05
	Soil Total for Planting										7.9E-07					2.5E-02
Receptor Total for Surveillance and Monitoring and Planting											1.2E-06					2.7E-02

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #4
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-ncncer Hazard nclculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Dry Forest Restoration Surveillance and Monitoring Risk Calculations															
Soil	Surface Soil (0-1 ft)	Lowlands Soil	Ingestion	Arsenic	1.3E+01	mg/kg	5.5E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	8.3E-08	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	5.1E-04
			Exp. Route Total								8.3E-08					5.1E-04
		Lowlands Soil	Dermal	Arsenic	1.3E+01	mg/kg	8.3E-09	mg/kg-day	1.5E+00	1/(mg/kg-day)	1.2E-08	2.3E-08	mg/kg-day	3.0E-04	mg/kg-day	7.7E-05
			Exp. Route Total								1.2E-08					7.7E-05
		Exposure Point Total									9.5E-08					5.9E-04
	Exposure Medium Total										9.5E-08					5.9E-04
	Ambient Air	Emissions from Lowlands Soil	Inhalation	Arsenic	1.6E-08	mg/m^3	1.6E-11	mg/m^3	4.3E-03	$1/(ug/m^3)$	6.9E-11	4.5E-11	mg/m^3	1.5E-05	mg/m^3	3.0E-06
			Exp. Route Total								6.9E-11					3.0E-06
		Exposure Point Total									6.9E-11					3.0E-06
	Exposure Medium Total										6.9E-11					3.0E-06
	Soil Total for Surveillance and Monitoring										9.5E-08					5.9E-04
	Dry Forest Restoration Planting Calculations															
	Surface Soil (0-1 ft)	Lowlands Soil	Ingestion	Arsenic	1.3E+01	mg/kg	1.1E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	1.6E-07	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	5.1E-03
			Exp. Route Total								1.6E-07					5.1E-03
		Lowlands Soil	Dermal	Arsenic	1.3E+01	mg/kg	7.4E-09	mg/kg-day	1.5E+00	1/(mg/kg-day)	1.1E-08	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	3.5E-04
			Exp. Route Total								1.1E-08					3.5E-04
		Exposure Point Total									1.7E-07					5.4E-03
	Exposure Medium Total										1.7E-07					5.4E-03
	Ambient Air	Emissions from Lowlands Soil	Inhalation	Arsenic	1.6E-08	mg/m^3	9.6E-12	mg/m^3	4.3E-03	$1/(ug/m^3)$	4.1E-11	1.4E-10	mg/m^3	1.5E-05	mg/m^3	9.0E-06
			Exp. Route Total								4.1E-11					9.0E-06
		Exposure Point Total									4.1E-11					9.0E-06
	Exposure Medium Total										4.1E-11					9.0E-06
	Soil Total for Planting										1.7E-07					5.4E-03
Receptor Total for Surveillance and Monitoring and Planting											2.7E-07					6.0E-03

TABLE 7.5.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #5
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-ncncer Hazard nclculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Surface Soil (0-2 ft)	Lagoon Fringe Soil	Ingestion	Arsenic	6.4E+00	mg/kg	4.6E-07	mg/kg-day	1.5E+00	1/(mg/kg-day)	7.0E-07	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	4.3E-03
			Exp. Route Total								7.0E-07					4.3E-03
		Lagoon Fringe Soil	Dermal	Arsenic	6.4E+00	mg/kg	7.0E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	1.0E-07	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	6.5E-04
			Exp. Route Total								1.0E-07					6.5E-04
		Exposure Point Total									8.0E-07					5.0E-03
	Exposure Medium Total										8.0E-07					5.0E-03
	Ambient Air	Emissions from Site-Wide Soil	Inhalation	Arsenic	8.0E-09	mg/m^3	6.8E-11	mg/m^3	4.3E-03	$1/(ug/m^3)$	2.9E-10	1.9E-10	mg/m^3	1.5E-05	mg/m^3	1.3E-05
			Exp. Route Total								2.9E-10					1.3E-05
		Exposure Point Total									2.9E-10					1.3E-05
	Exposure Medium Total										2.9E-10					1.3E-05
Soil Total											8.0E-07					5.0E-03
Sediment	Sediment	Lagoon Sediment	Ingestion	Arsenic	2.5E+00	mg/kg	1.8E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	2.7E-08	5.0E-08	mg/kg-day	3.0E-04	mg/kg-day	1.7E-04
			Exp. Route Total								2.7E-08					1.7E-04
		Lagoon Sediment	Dermal	Arsenic	2.5E+00	mg/kg	2.7E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	4.0E-08	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	2.5E-04
			Exp. Route Total								4.0E-08					2.5E-04
		Exposure Point Total									6.7E-08					4.2E-04
	Exposure Medium Total										6.7E-08					4.2E-04
Sediment Total											6.7E-08					4.2E-04
Surface Water	Surface Water	Lagoon Surface Water	Dermal	Arsenic	1.9E+00	ug/L	1.4E-08	mg/kg-day	1.5E+00	1/(mg/kg-day)	2.1E-08	4.0E-08	mg/kg-day	3.0E-04	mg/kg-day	1.3E-04
				Cobalt	3.1E+00	ug/L	8.9E-09	mg/kg-day	NA	NA	NA	2.5E-08	mg/kg-day	3.0E-04	mg/kg-day	8.3E-05
				Thallium	7.0E-01	ug/L	5.1E-09	mg/kg-day	NA	NA	NA	1.4E-08	mg/kg-day	1.0E-05	mg/kg-day	1.4E-03
			Exp. Route Total								2.1E-08					1.6E-03
		Exposure Point Total									2.1E-08					1.6E-03
	Exposure Medium Total										2.1E-08					1.6E-03
Surface Water Total											2.1E-08					1.6E-03
Receptor Total											8.9E-07					7.0E-03

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Receptor Population: FWS Worker #1
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil (0-2 ft)	Site-Wide Soil	Arsenic	9E-07	NA	1E-07	1E-06	Skin, Cardiovascular System	6E-03	NA	8E-04	6E-03
		Exposure Point Total		9E-07	NA	1E-07	1E-06		6E-03	NA	8E-04	6E-03
	Exposure Medium Total			9E-07	NA	1E-07	1E-06		6E-03	NA	8E-04	6E-03
	Ambient Air	Emissions from Site-Wide Soil	Arsenic	NA	9E-10	NA	9E-10	Cardiovascular System, Nervous System, Development	NA	4E-05	NA	4E-05
		Exposure Point Total		NA	9E-10	NA	9E-10		NA	4E-05	NA	4E-05
	Exposure Medium Total			NA	9E-10	NA	9E-10		NA	4E-05	NA	4E-05
Medium Total				9E-07	9E-10	1E-07	1E-06		6E-03	4E-05	8E-04	6E-03
Sediment	Sediment	Lagoon Sediment	Arsenic	3E-08	NA	4E-08	7E-08	Skin, Cardiovascular System	2E-04	NA	3E-04	4E-04
		Exposure Point Total		3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
	Exposure Medium Total			3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
Medium Total				3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
Surface Water	Surface Water	Lagoon Surface Water	Arsenic	NA	NA	2E-08	2E-08	Skin, Cardiovascular System	NA	NA	1E-04	1E-04
			Cobalt	NA	NA	NA	NA	Thyroid	NA	NA	8E-05	8E-05
			Thallium	NA	NA	NA	NA	Hair	NA	NA	1E-03	1E-03
		Exposure Point Total		NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
	Exposure Medium Total			NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
Medium Total				NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
Receptor Total				9E-07	9E-10	2E-07	1E-06		6E-03	4E-05	3E-03	8E-03

Total Skin HI Across Media =	7E-03
Total Cardiovascular System HI Across Media =	7E-03
Total Thyroid HI Across Media =	8E-05
Total Hair HI Across Media =	1E-03
Total Nervous System HI Across Media =	4E-05
Total Development HI Across Media =	4E-05

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Current/Future
Receptor Population: FWS Worker #2
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil (0-2 ft)	Bahia Playa Blanca Beach Soil	Arsenic	5E-07	NA	7E-08	5E-07	Skin, Cardiovascular System	3E-03	NA	4E-04	3E-03
		Exposure Point Total		5E-07	NA	7E-08	5E-07		3E-03	NA	4E-04	3E-03
	Exposure Medium Total			5E-07	NA	7E-08	5E-07		3E-03	NA	4E-04	3E-03
	Ambient Air	Emissions from Bahia Playa Blanca Beach Soil	Arsenic	NA	3E-10	NA	3E-10	Cardiovascular System, Nervous System, Development	NA	1E-05	NA	1E-05
		Exposure Point Total		NA	3E-10	NA	3E-10		NA	1E-05	NA	1E-05
	Exposure Medium Total			NA	3E-10	NA	3E-10		NA	1E-05	NA	1E-05
Medium Total				5E-07	3E-10	7E-08	5E-07		3E-03	1E-05	4E-04	3E-03
Receptor Total				5E-07	3E-10	7E-08	5E-07		3E-03	1E-05	4E-04	3E-03

Total Skin HI Across Media =	3E-03
Total Cardiovascular System HI Across Media =	3E-03
Total Nervous System HI Across Media =	1E-05
Total Development HI Across Media =	1E-05

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #3
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Dry Forest Restoration Surveillance and Monitoring Risk Calculations											
Soil	Surface Soil (0-1.5 ft)	Uplands Soil	Arsenic	4E-07	NA	6E-08	4E-07	Skin, Cardiovascular System	2E-03	NA	3E-04	3E-03
		Exposure Point Total		4E-07	NA	6E-08	4E-07		2E-03	NA	3E-04	3E-03
	Exposure Medium Total			4E-07	NA	6E-08	4E-07		2E-03	NA	3E-04	3E-03
	Ambient Air	Emissions from Uplands Soil	Arsenic	NA	4E-10	NA	4E-10	Cardiovascular System, Nervous System, Development	NA	2E-05	NA	2E-05
		Exposure Point Total		NA	4E-10	NA	4E-10		NA	2E-05	NA	2E-05
	Exposure Medium Total			NA	4E-10	NA	4E-10		NA	2E-05	NA	2E-05
	Soil Total for Surveillance and Monitoring			4E-07	4E-10	6E-08	4E-07		2E-03	2E-05	3E-04	3E-03
	Dry Forest Restoration Planting Calculations											
	Surface Soil (0-1.5 ft)	Uplands Soil	Arsenic	7E-07	NA	5E-08	8E-07	Skin, Cardiovascular System	2E-02	NA	2E-03	2E-02
		Exposure Point Total		7E-07	NA	5E-08	8E-07		2E-02	NA	2E-03	2E-02
	Exposure Medium Total			7E-07	NA	5E-08	8E-07		2E-02	NA	2E-03	2E-02
	Ambient Air	Emissions from Uplands Soil	Arsenic	NA	2E-10	NA	2E-10	Cardiovascular System, Nervous System, Development	NA	5E-05	NA	5E-05
		Exposure Point Total		NA	2E-10	NA	2E-10		NA	5E-05	NA	5E-05
	Exposure Medium Total			NA	2E-10	NA	2E-10		NA	5E-05	NA	5E-05
	Soil Total for Planting			7E-07	2E-10	5E-08	8E-07		2E-02	5E-05	2E-03	2E-02
Receptor Total				1E-06	6E-10	1E-07	1E-06		3E-02	7E-05	2E-03	3E-02

Total Skin HI Across Media =	3E-02
Total Cardiovascular System HI Across Media =	3E-02
Total Nervous System HI Across Media =	7E-05
Total Development HI Across Media =	7E-05

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #4
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
	Dry Forest Restoration Surveillance and Monitoring Risk Calculations											
Soil	Surface Soil (0-1 ft)	Lowlands Soil	Arsenic	8E-08	NA	1E-08	9E-08	Skin, Cardiovascular System	5E-04	NA	8E-05	6E-04
		Exposure Point Total		8E-08	NA	1E-08	9E-08		5E-04	NA	8E-05	6E-04
	Exposure Medium Total			8E-08	NA	1E-08	9E-08		5E-04	NA	8E-05	6E-04
	Ambient Air	Emissions from Lowlands Soil	Arsenic	NA	7E-11	NA	7E-11	Cardiovascular System, Nervous System, Development	NA	3E-06	NA	3E-06
		Exposure Point Total		NA	7E-11	NA	7E-11		NA	3E-06	NA	3E-06
	Exposure Medium Total			NA	7E-11	NA	7E-11		NA	3E-06	NA	3E-06
	Soil Total for Surveillance and Monitoring			8E-08	7E-11	1E-08	1E-07		5E-04	3E-06	8E-05	6E-04
	Dry Forest Restoration Planting Calculations											
	Surface Soil (0-1 ft)	Lowlands Soil	Arsenic	2E-07	NA	1E-08	2E-07	Skin, Cardiovascular System	5E-03	NA	3E-04	5E-03
		Exposure Point Total		2E-07	NA	1E-08	2E-07		5E-03	NA	3E-04	5E-03
	Exposure Medium Total			2E-07	NA	1E-08	2E-07		5E-03	NA	3E-04	5E-03
	Ambient Air	Emissions from Lowlands Soil	Arsenic	NA	4E-11	NA	4E-11	Cardiovascular System, Nervous System, Development	NA	9E-06	NA	9E-06
		Exposure Point Total		NA	4E-11	NA	4E-11		NA	9E-06	NA	9E-06
	Exposure Medium Total			NA	4E-11	NA	4E-11		NA	9E-06	NA	9E-06
	Soil Total for Planting			2E-07	4E-11	1E-08	2E-07		5E-03	9E-06	3E-04	5E-03
Receptor Total				2E-07	1E-10	2E-08	3E-07		6E-03	1E-05	4E-04	6E-03

Total Skin HI Across Media =	6E-03
Total Cardiovascular System HI Across Media =	6E-03
Total Nervous System HI Across Media =	1E-05
Total Development HI Across Media =	1E-05

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Scenario Timeframe: Future
Receptor Population: FWS Worker #5
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil (0-2 ft)	Lagoon Fringe Soil	Arsenic	7E-07	NA	1E-07	8E-07	Skin, Cardiovascular System	4E-03	NA	6E-04	5E-03
		Exposure Point Total		7E-07	NA	1E-07	8E-07		4E-03	NA	6E-04	5E-03
	Exposure Medium Total			7E-07	NA	1E-07	8E-07		4E-03	NA	6E-04	5E-03
	Ambient Air	Emissions from Site-Wide Soil	Arsenic	NA	3E-10	NA	3E-10	Cardiovascular System, Nervous System, Development	NA	1E-05	NA	1E-05
		Exposure Point Total		NA	3E-10	NA	3E-10		NA	1E-05	NA	1E-05
	Exposure Medium Total			NA	3E-10	NA	3E-10		NA	1E-05	NA	1E-05
Medium Total				7E-07	3E-10	1E-07	8E-07		4E-03	1E-05	6E-04	5E-03
Sediment	Sediment	Lagoon Sediment	Arsenic	3E-08	NA	4E-08	7E-08	Skin, Cardiovascular System	2E-04	NA	3E-04	4E-04
		Exposure Point Total		3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
	Exposure Medium Total			3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
Medium Total				3E-08	NA	4E-08	7E-08		2E-04	NA	3E-04	4E-04
Surface Water	Surface Water	Lagoon Surface Water	Arsenic	NA	NA	2E-08	2E-08	Skin, Cardiovascular System	NA	NA	1E-04	1E-04
			Cobalt	NA	NA	NA	NA	Thyroid	NA	NA	8E-05	8E-05
			Thallium	NA	NA	NA	NA	Hair	NA	NA	1E-03	1E-03
		Exposure Point Total		NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
	Exposure Medium Total			NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
Medium Total				NA	NA	2E-08	2E-08		NA	NA	2E-03	2E-03
Receptor Total				7E-07	3E-10	2E-07	9E-07		4E-03	1E-05	3E-03	7E-03

Total Skin HI Across Media =	6E-03
Total Cardiovascular System HI Across Media =	6E-03
Total Thyroid HI Across Media =	8E-05
Total Hair HI Across Media =	1E-03
Total Nervous System HI Across Media =	1E-05
Total Development HI Across Media =	1E-05

Attachment K-2
Tables and Figures

Table 1 - Attachment K-2

FWS Exposure Scenarios Evaluated in the HHRA

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Scenario Timeframe	Receptor Population	Exposure Point	Sample Assignment (1)	Exposure Route	Anticipated FWS Work Activities
Current/Future	FWS Worker #1	Site-Wide Soil	Site_SS	Ingestion, Dermal, Inhalation	FWS Wildlife Survey and Monitoring Workers who conduct wildlife surveillance and monitoring (e.g., migratory water fowl).
		Lagoon Sediment	Lagoon_Sed	Ingestion, Dermal	
		Lagoon Surface Water	Lagoon_SW	Dermal	
	FWS Worker #2	Bahia Playa Blanca Beach Soil	BPB_SS_0-2	Ingestion, Dermal, Inhalation	FWS Sea Turtle Monitoring Workers who conduct sea turtle monitoring and conservation activities.
Future	FWS Worker #3	Uplands Soil	Upland_SS	Ingestion, Dermal, Inhalation	FWS ECA Upland Dry Forest Restoration Workers who conduct restoration, surveillance and monitoring of the Uplands.
	FWS Worker #4	Lowlands Soil	LowLand_SS	Ingestion, Dermal, Inhalation	FWS ECA Lowland Forest Restoration Workers who conduct restoration, surveillance and monitoring of the Lowlands.
	FWS Worker #5	Lagoon Fringe Soil	Lag_Fringe_SS	Ingestion, Dermal, Inhalation	FWS Wildlife Survey and Monitoring Workers who conduct wildlife surveillance and monitoring (e.g., migratory water fowl).
		Lagoon Sediment	Lagoon_Sed	Ingestion, Dermal	
		Lagoon Surface Water	Lagoon_SW	Dermal	

Note:

(1) Sample Assignment correspond to those presented in Tables 1 and 2 of Appendix B.

FWS: Fish and Wildlife Service

Table 2 - Attachment K-2
HHRA Sample Assignment Descriptions and Counts
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Matrix	Sample Assignment	Definition	Depth Interval	Sample Count
Soil	Site_SS	Sitewide Surface Soil (IS)	0-2 inches	27
		Sitewide Surface Soil (discrete)	2 inches - 2 ft	9
	BPB_SS_0-2	Bahia Playa Blanca Beach Surface Soil (IS)	0-2 inches	2
		Bahia Playa Blanca Beach Surface Soil (discrete)	1.5 - 2 ft	2
	Upland_SS	Upland Surface Soil (IS)	0-2 inches	15
		Upland Surface Soil (discrete)	2 inches - 1.5 ft	2
	LowLand_SS	Lowland Surface Soil (IS)	0-2 inches	5
		Lowland Surface Soil (discrete)	2 inches - 1 ft	2
	Lag_Fringe_SS	Lagoon Fringe Surface Soil (IS)	0-2 inches	5
		Lagoon Fringe Surface Soil (discrete)	2 inches - 2 ft	5
Sediment	Lagoon_Sed	Lagoon Sediment	--	15
Surface Water	Lagoon_SW	Lagoon Surface Water	--	5

IS: Incremental sample

Table 3 - Attachment K-2
Sample Assignments
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Matrix	Sample ID	Station ID	Upper Depth (feet)	Lower Depth (feet)	Collection Date	Sample (1) Type	Sample Assignment #1	Sample Assignment #2	Exclusion Rationale
SS	VEECA-1SB01-1H02-0211	VEECA-1SB01	1.5	2	2/8/11 9:45	N	BPB_SS_0-2		
SS	VEECA-1SB02-1H02-0211	VEECA-1SB02	1.5	2	2/8/11 9:55	N	BPB_SS_0-2		
SS	VEECA-2SB03-0001-0211	VEECA-2SB03	0	1	2/9/11 9:40	N	LowLand_SS	Site_SS	
SS	VEECA-2SB13-000H-0211	VEECA-2SB13	0	0.5	2/10/11 9:55	N	LowLand_SS	Site_SS	
SS	VEECA-3SB01-0001-0211	VEECA-3SB01	0	1	2/11/11 10:55	N	Lag_Fringe_SS	Site_SS	
SS	VEECA-3SB02-0001-0211	VEECA-3SB02	0	1	2/11/11 10:25	N	Lag_Fringe_SS	Site_SS	
SS	VEECA-3SB03-0002-0211	VEECA-3SB03	0	2	2/10/11 14:10	N	Lag_Fringe_SS	Site_SS	
SS	VEECA-3SB04-001H-0211	VEECA-3SB04	0	1.5	2/14/11 8:30	N	Lag_Fringe_SS	Site_SS	
SS	VEECA-3SB05-0002-0211	VEECA-3SB05	0	2	2/10/11 14:40	N	Lag_Fringe_SS	Site_SS	
SS	VEECA-4SB01-001H-0211	VEECA-4SB01	0	1.5	2/18/11 8:30	N	Upland_SS	Site_SS	
SD	VEECA-5SD01-000H-0211	VEECA-5SD01	0	0.5	2/10/11 9:30	N	Lagoon_Sed		
SD	VEECA-5SD02-000H-0211	VEECA-5SD02	0	0.5	2/10/11 9:00	N	Lagoon_Sed		
SD	VEECA-5SD03-000H-0211	VEECA-5SD03	0	0.5	2/10/11 11:05	N	Lagoon_Sed		
SD	VEECA-5SD04-000H-0211	VEECA-5SD04	0	0.5	2/10/11 10:45	N	Lagoon_Sed		
SD	VEECA-5SD05-000H-0211	VEECA-5SD05	0	0.5	2/10/11 13:20	N	Lagoon_Sed		
SD	VEECA-5SD06-000H-0211	VEECA-5SD06	0	0.5	2/10/11 14:05	N	Lagoon_Sed		
SD	VEECA-5SD07-000H-0211	VEECA-5SD07	0	0.5	2/10/11 14:25	N	Lagoon_Sed		
SD	VEECA-5SD08-000H-0211	VEECA-5SD08	0	0.5	2/10/11 15:00	N	Lagoon_Sed		
SD	VEECA-5SD09-000H-0211	VEECA-5SD09	0	0.5	2/10/11 12:20	N	Lagoon_Sed		
SD	VEECA-5SD10-000H-0211	VEECA-5SD10	0	0.5	2/10/11 10:25	N	Lagoon_Sed		
SD	VEECA-5SD11-000H-0211	VEECA-5SD11	0	0.5	2/10/11 9:55	N	Lagoon_Sed		
SD	VEECA-5SD12-000H-0211	VEECA-5SD12	0	0.5	2/10/11 12:00	N	Lagoon_Sed		
SD	VEECA-5SD13-000H-0211	VEECA-5SD13	0	0.5	2/10/11 16:00	N	Lagoon_Sed		
SD	VEECA-5SD14-000H-0211	VEECA-5SD14	0	0.5	2/10/11 15:25	N	Lagoon_Sed		
SD	VEECA-5SD15-000H-0211	VEECA-5SD15	0	0.5	2/10/11 15:35	N	Lagoon_Sed		
SMI	VEECA-1SMI01-0211	VEECA-1DU01	0	0.17	2/7/11 13:30	N	BPB_SS_0-2	Site_SS	
SMI	VEECA-1SMI02-0211	VEECA-1DU02	0	0.17	2/7/11 12:45	N	BPB_SS_0-2	Site_SS	
SMI	VEECA-2SMI01-0211	VEECA-2DU01	0	0.17	2/4/11 10:00	N	LowLand_SS	Site_SS	
SMI	VEECA-2SMI02-0211	VEECA-2DU02	0	0.17	2/14/11 9:00	N	LowLand_SS	Site_SS	
SMI	VEECA-2SMI03-0211	VEECA-2DU03	0	0.17	2/7/11 8:55	N	LowLand_SS	Site_SS	
SMI	VEECA-2SMI04-0211	VEECA-2DU04	0	0.17	2/7/11 10:55	N	LowLand_SS	Site_SS	
SMI	VEECA-2SMI05-0211	VEECA-2DU05	0	0.17	2/7/11 12:00	N	LowLand_SS	Site_SS	
SMI	VEECA-3SMI01-0211	VEECA-3DU01	0	0.17	2/14/11 13:00	N	Lag_Fringe_SS	Site_SS	
SMI	VEECA-3SMI02-0211	VEECA-3DU02	0	0.17	2/14/11 11:50	N	Lag_Fringe_SS	Site_SS	
SMI	VEECA-3SMI03-0211	VEECA-3DU03	0	0.17	2/14/11 11:25	N	Lag_Fringe_SS	Site_SS	
SMI	VEECA-3SMI04-0211	VEECA-3DU04	0	0.17	2/14/11 10:35	N	Lag_Fringe_SS	Site_SS	
SMI	VEECA-3SMI05-0211	VEECA-3DU05	0	0.17	2/14/11 9:50	N	Lag_Fringe_SS	Site_SS	
SMI	VEECA-4SMI01-0211	VEECA-4DU01	0	0.17	2/2/11 12:15	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI02-0211	VEECA-4DU02	0	0.17	2/2/11 11:00	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI03-0211	VEECA-4DU03	0	0.17	2/7/11 9:30	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI04-0211	VEECA-4DU04	0	0.17	2/15/11 11:40	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI05-0211	VEECA-4DU05	0	0.17	2/7/11 10:10	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI06-0211	VEECA-4DU06	0	0.17	2/15/11 10:45	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI07-0211	VEECA-4DU07	0	0.17	2/15/11 12:55	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI08-0211	VEECA-4DU08	0	0.17	2/14/11 13:50	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI09-0211	VEECA-4DU09	0	0.17	2/15/11 9:55	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI10-0211	VEECA-4DU10	0	0.17	2/15/11 8:45	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI11-0211	VEECA-4DU11	0	0.17	2/3/11 13:20	N	Upland_SS	Site_SS	

Table 3 - Attachment K-2
Sample Assignments
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Matrix	Sample ID	Station ID	Upper Depth (feet)	Lower Depth (feet)	Collection Date	Sample (1) Type	Sample Assignment #1	Sample Assignment #2	Exclusion Rationale
SMI	VEECA-4SMI12-0211	VEECA-4DU12	0	0.17	2/4/11 9:06	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI13-0211	VEECA-4DU13	0	0.17	2/3/11 11:16	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI14-0211	VEECA-4DU14	0	0.17	2/3/11 10:35	N	Upland_SS	Site_SS	
SMI	VEECA-4SMI15-0211	VEECA-4DU15	0	0.17	2/3/11 9:40	N	Upland_SS	Site_SS	
SS	VEECA-4SS01-0001-0211	VEECA-4SS01	0	1	2/8/11 8:30	N	Upland_SS	Site_SS	
SW	VEECA-5SW01-0211	VEECA-5SW01	--	--	2/9/11 9:25	N	Lagoon_SW		
SW	VEECA-5SW02-0211	VEECA-5SW02	--	--	2/9/11 10:10	N	Lagoon_SW		
SW	VEECA-5SW03-0211	VEECA-5SW03	--	--	2/9/11 10:55	N	Lagoon_SW		
SW	VEECA-5SW04-0211	VEECA-5SW04	--	--	2/9/11 11:35	N	Lagoon_SW		
SW	VEECA-5SW05-0211	VEECA-5SW05	--	--	2/9/11 12:30	N	Lagoon_SW		
SMI	VEECA-6SMI01-0211	VEECA-6DU01	0	0.17	2/16/11 15:30	N			Background Decision Unit (2).
SMI	VEECA-6SMI02-0211	VEECA-6DU02	0	0.17	2/16/11 14:45	N			Background Decision Unit (2).
SMI	VEECA-6SMI03-0211	VEECA-6DU03	0	0.17	2/16/11 12:25	N			Background Decision Unit (2).
SMI	VEECA-6SMI04-0211	VEECA-6DU04	0	0.17	2/17/11 15:40	N			Background Decision Unit (2).
SMI	VEECA-6SMI05-0211	VEECA-6DU05	0	0.17	2/17/11 15:00	N			Background Decision Unit (2).
SMI	VEECA-6SMI06-0211	VEECA-6DU06	0	0.17	2/17/11 12:40	N			Background Decision Unit (2).
SMI	VEECA-6SMI07-0211	VEECA-6DU07	0	0.17	2/17/11 9:00	N			Background Decision Unit (2).
SMI	VEECA-6SMI08-0211	VEECA-6DU08	0	0.17	2/17/11 13:20	N			Background Decision Unit (2).
SMI	VEECA-6SMI09-0211	VEECA-6DU09	0	0.17	2/17/11 10:25	N			Background Decision Unit (2).
SMI	VEECA-6SMI10-0211	VEECA-6DU10	0	0.17	2/17/11 14:45	N			Background Decision Unit (2).
SB	VEECA-2SB01-0103-0211	VEECA-2SB01	1	3	2/9/11 10:15	N			Sample is too deep (2).
SB	VEECA-2SB02-0103-0211	VEECA-2SB02	1	3	2/9/11 9:15	N			Sample is too deep (2).
SB	VEECA-2SB04-0507-0211	VEECA-2SB04	5	7	2/9/11 12:40	N			Sample is too deep (2).
SB	VEECA-2SB05-0507-0211	VEECA-2SB05	5	7	2/9/11 14:40	N			Sample is too deep (2).
SB	VEECA-2SB06-0507-0211	VEECA-2SB06	5	7	2/9/11 13:25	N			Sample is too deep (2).
SB	VEECA-2SB07-0H2H-0211	VEECA-2SB07	0.5	2.5	2/8/11 11:10	N			Sample is too deep (2).
SB	VEECA-2SB08-0204-0211	VEECA-2SB08	2	4	2/8/11 12:00	N			Sample is too deep (2).
SB	VEECA-2SB09-4H6H-0211	VEECA-2SB09	4.5	6.5	2/8/11 13:15	N			Sample is too deep (2).
SB	VEECA-2SB10-0204-0211	VEECA-2SB10	2	4	2/10/11 13:15	N			Sample is too deep (2).
SB	VEECA-2SB11-7H9H-0211	VEECA-2SB11	7.5	9.5	2/11/11 9:40	N			Sample is too deep (2).
SB	VEECA-2SB12-0H2H-0211	VEECA-2SB12	0.5	2.5	2/11/11 8:27	N			Sample is too deep (2).
SB	VEECA-2SB14-1H3H-0211	VEECA-2SB14	1.5	3.5	2/10/11 9:25	N			Sample is too deep (2).
SB	VEECA-2SB15-0406-0211	VEECA-2SB15	4	6	2/10/11 11:50	N			Sample is too deep (2).

Note:
(1) When associated field duplicate sample has a higher detected conentration or a lower non-detected concentration (when both values were non-detected) for a chemical, the concentration of field duplicate sample was used for the chemical for the normal sample.
(2) Samples that are not to be used in the HHRA are highlighted in gray.

Matrix Definitions

SB =	Subsurface
SD =	Sediment
SMI =	Incremental sample
SS =	Surface Soil
SW =	Surface Water
N =	Normal Sample

HHRA Assignment Definitions

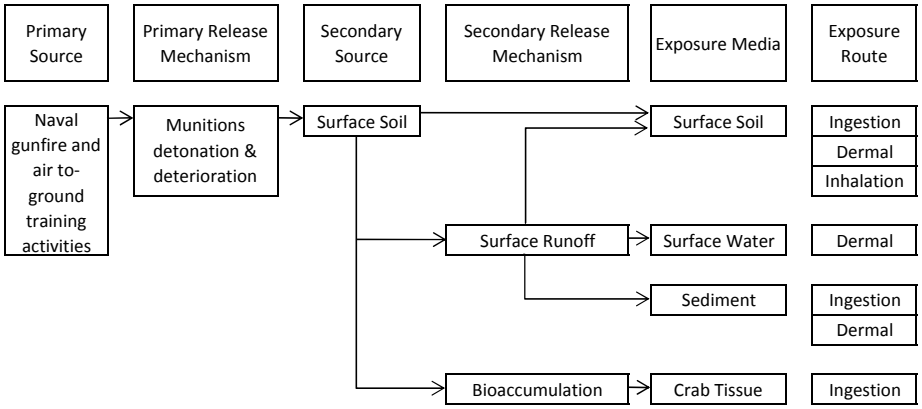
BPB_SS_0-2	Bahia Playa Blanca Surface Soil (0-2 ft)
LowLand_SS	Lowland Surface Soil (0-1 ft)
Lag_Fringe_SS	Lagoon Fringe Surface Soil (0-2 ft)
Upland_SS	Upland Surface Soil (0-1.5 ft)
Lagoon_Sed	Lagoon Sediment
Lagoon_SW	Lagoon Surface Water
Site_SS	Sitewide Surface Soil (0-2 ft)

Table 4 - Attachment K-2
Comparison of ECA Sample Population Exposure Point Concentrations
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Exposure Point	Chemical of Potential Concern	Samples Used											
		IS + Discretes				Discretes				IS			
		FOD	Max (mg/kg)	Average (mg/kg)	UCL (mg/kg)	FOD	Max (mg/kg)	Average (mg/kg)	UCL (mg/kg)	FOD	Max (mg/kg)	Average (mg/kg)	UCL (mg/kg)
Site-wide Soil	Arsenic	29 / 36	36.1	11.2	12.15	6 / 9	23.8	12.65	14.86	23 / 27	36.1	10.83	12.46
Bahia Playa Blanca Beach Soil	Arsenic	1 / 4	1.7	--	(a)	0 / 2	--	--	--	1 / 2	1.7	--	(a)
Uplands Soil	Arsenic	17 / 17	36.1	13.91	17.74	2 / 2	23.8	--	(a)	15 / 15	36.1	13.78	17.75
Lowlands Soil	Arsenic	6 / 7	21.7	9.267	13.13	2 / 2	21.7	--	(a)	4 / 5	9.3	7.5	8.623
Lagoon Fringe Soil	Arsenic	5 / 10	13.5	6.24	6.379	2 / 5	13.5	--	(a)	3 / 5	4.8	3.533	4.32

Notes:
FOD = Frequency of Detection
IS = Incremental Sample
UCL = Upper Confidence Limit
Max = Maximum Detected Concentration
(a) Insufficient number of detected concentrations (for IS samples) or samples (for discrete samples) to calculate a UCL.

mg/kg= milligrams/kilogram



Exposure Route	Potential Human Receptors: Current/Future					Future		
	FWS Worker #1	FWS Worker #2	FWS Law Enforcement Worker	Coast Guard Worker	Trespasser	FWS Worker #3	FWS Worker #4	FWS Worker #5
Ingestion	$X^{(S)}$	$X^{(B)}$	(1)	(1)	(1)	$X^{(U)}$	$X^{(L)}$	$X^{(F)}$
Dermal	$X^{(S)}$	$X^{(B)}$	(1)	(1)	(1)	$X^{(U)}$	$X^{(L)}$	$X^{(F)}$
Inhalation	$X^{(S)}$	$X^{(B)}$	(1)	(1)	(1)	$X^{(U)}$	$X^{(L)}$	$X^{(F)}$
Dermal	X				(1)			X
Ingestion	X				(1)			X
Dermal	X				(1)			X
Ingestion					(1)			

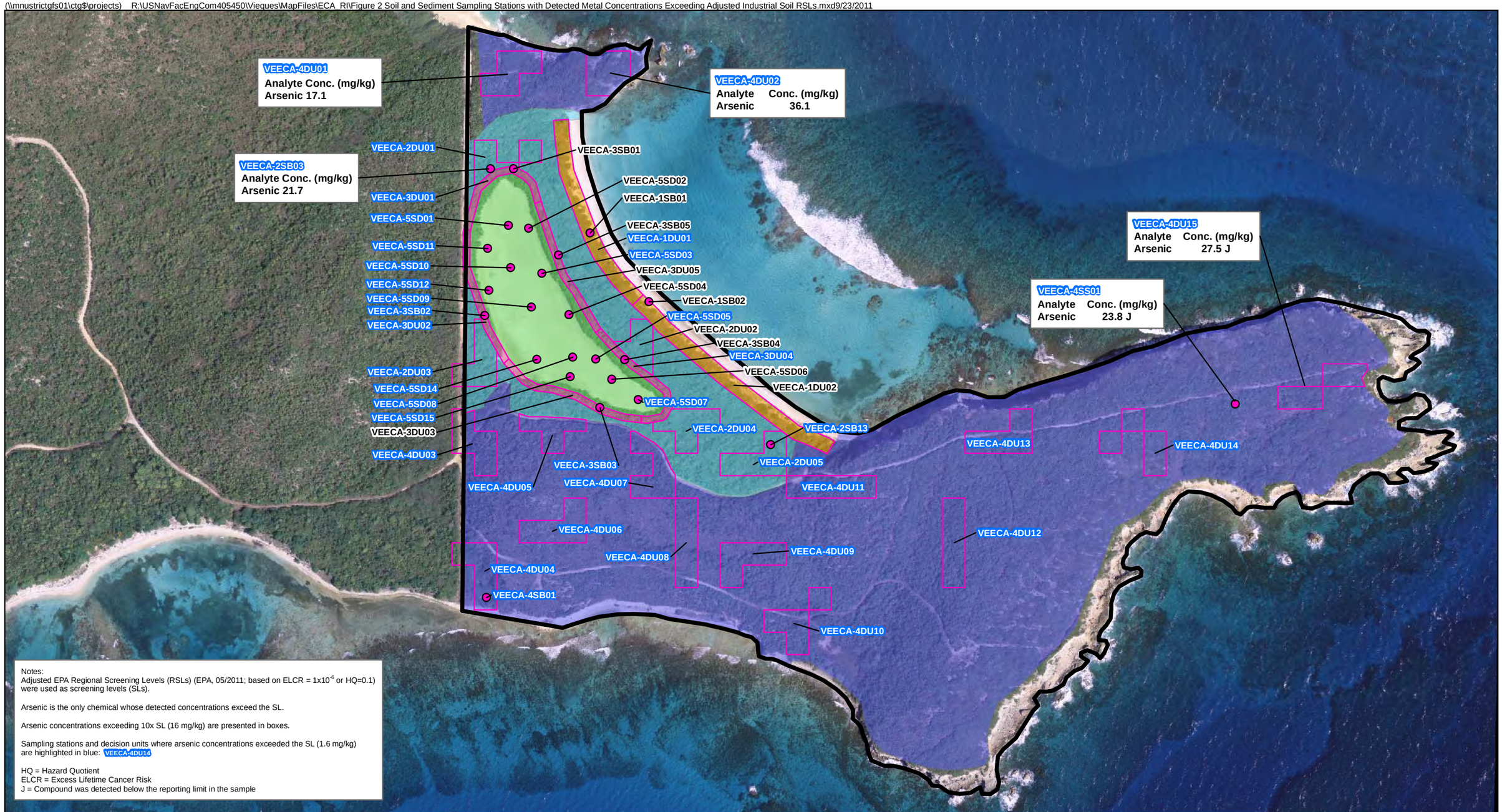
Legend
X Potentially complete exposure pathways.
(1) Pathway will be addressed qualitatively only.

Soil exposure areas consist of the following:
(S) Sitewide Soil, (B) Bahia Playa Blanca Beach Soil, (U) Uplands Soil, (L) Lowlands Soil, (F) Lagoon Fringe Soil.

Description of Fish and Wildlife Service (FWS) Workers
FWS Worker #1: FWS Workers who engage in wildlife surveillance and monitoring (e.g., migratory water fowl)
FWS Worker #2: FWS Workers who engage in sea turtle monitoring and conservation activities.
FWS Worker #3: FWS Forest Restoration Workers who conduct restoration, surveillance and monitoring of the Uplands.
FWS Worker #4: FWS Forest Restoration Workers who conduct restoration, surveillance and monitoring of the Lowlands.
FWS Worker #5: FWS Workers who engage in wildlife surveillance and monitoring (e.g., migratory water fowl)

Figure 1
Potential Exposure Pathways for Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 2 Soil and Sediment Sampling Stations with Detected Metal Concentrations Exceeding Adjusted Industrial Soil RSLs.mxd9/23/2011

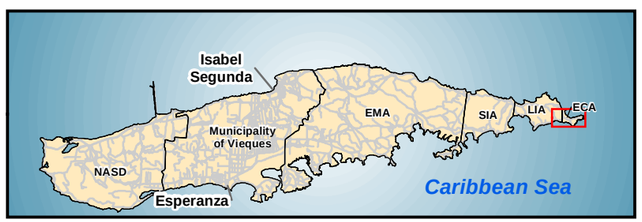


Legend

- Discrete Sample Station
- Decision Unit (Area of Incremental Sampling)
- **Eastern Conservation Area Boundary**

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe



N
W E
S

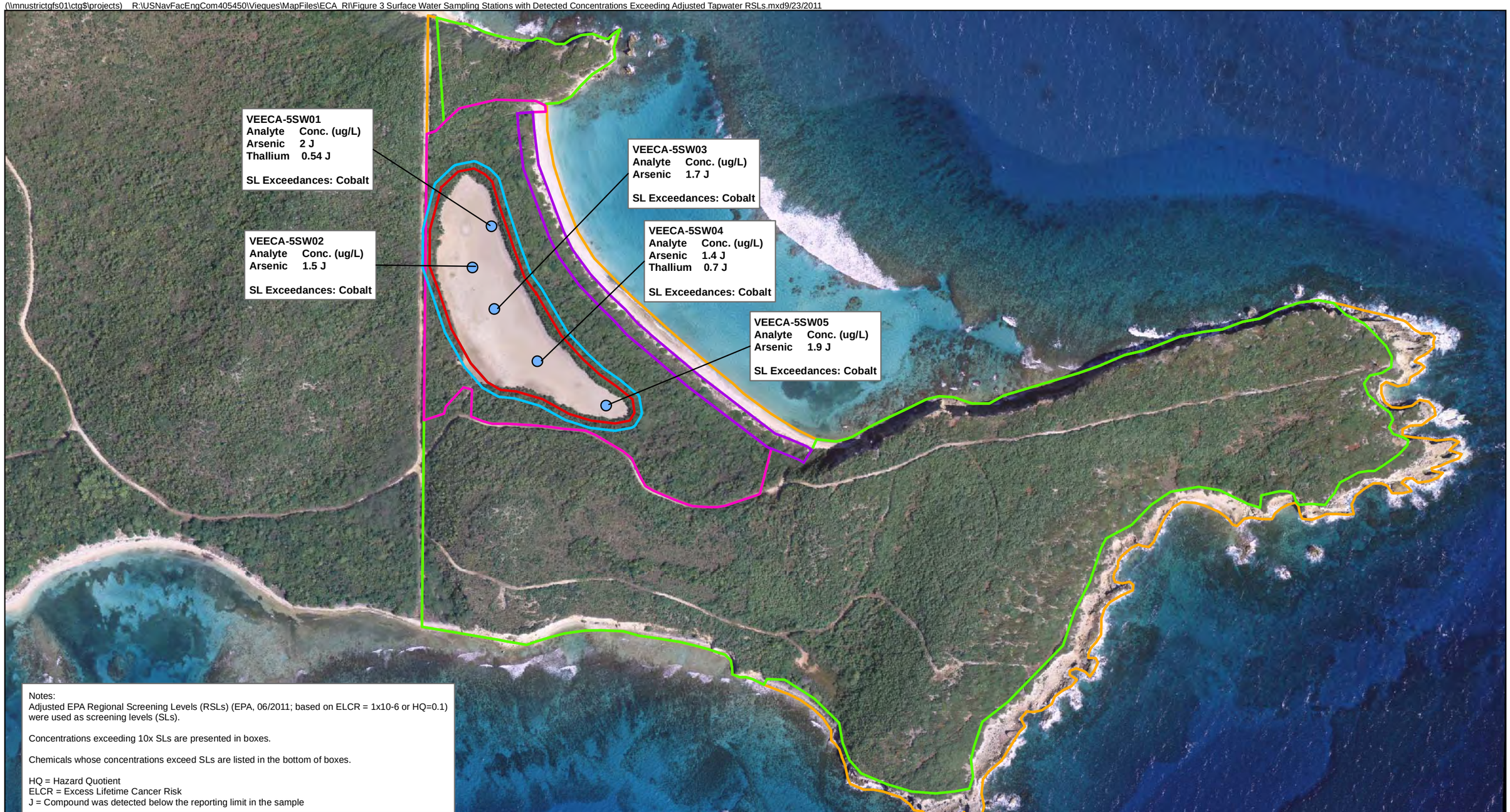
0 200 400 800 Feet

2007 Aerial Image

Figure 2
Soil and Sediment Sampling Stations with Detected Metal Concentrations Exceeding Adjusted Industrial Soil RSLs
Eastern Conservation Area, Vieques, Puerto Rico

CH2MHILL®

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure 3 Surface Water Sampling Stations with Detected Concentrations Exceeding Adjusted Tapwater RSLs.mxd9/23/2011



Notes:
Adjusted EPA Regional Screening Levels (RSLs) (EPA, 06/2011; based on ELCR = 1x10-6 or HQ=0.1) were used as screening levels (SLs).

Concentrations exceeding 10x SLs are presented in boxes.

Chemicals whose concentrations exceed SLs are listed in the bottom of boxes.

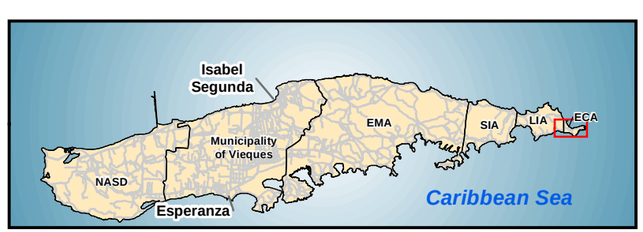
HQ = Hazard Quotient
ELCR = Excess Lifetime Cancer Risk
J = Compound was detected below the reporting limit in the sample

Legend

- Surface Water Sampling Station

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe
- Eastern Conservation Area Boundary



N
W E
S

0 200 400 800 Feet

2007 Aerial Image

Figure 3
Surface Water Sampling Stations with Detected Concentrations Exceeding Adjusted Tapwater RSLs
Eastern Conservation Area, Vieques, Puerto Rico

CH2MHILL

Attachment K-3
Analytical Data Used in the HHRA

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7429-90-5	Aluminum	30300	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7439-89-6	Iron	25900	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7439-92-1	Lead	10.1	=	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7439-95-4	Magnesium	4800	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7439-96-5	Manganese	763	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-02-0	Nickel	13	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-09-7	Potassium	6530	J	MG/KG	50	500	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-23-5	Sodium	242	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-38-2	Arsenic	3.9	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-39-3	Barium	74.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-41-7	Beryllium	0.73	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-43-9	Cadmium	0.3	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-47-3	Chromium	42.4	J	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-48-4	Cobalt	6.6	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-50-8	Copper	16.3	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-62-2	Vanadium	42.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-66-6	Zinc	27.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7440-70-2	Calcium	23500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU01	VEECA-6SMI01-0211	0	0.17	16-Feb-11	SMI	7782-49-2	Selenium	2.1	J	MG/KG	1	3	6020	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7429-90-5	Aluminum	30100	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7439-89-6	Iron	26300	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7439-92-1	Lead	9.5	=	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7439-95-4	Magnesium	4760	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7439-96-5	Manganese	588	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-02-0	Nickel	12.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-09-7	Potassium	6360	J	MG/KG	50	500	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-23-5	Sodium	246	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-38-2	Arsenic	5.3	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-39-3	Barium	71.9	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-41-7	Beryllium	0.74	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-43-9	Cadmium	0.25	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-47-3	Chromium	44.2	J	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-48-4	Cobalt	6.4	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-50-8	Copper	17.6	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-62-2	Vanadium	41.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-66-6	Zinc	24.3	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7440-70-2	Calcium	37300	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU02	VEECA-6SMI02-0211	0	0.17	16-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7429-90-5	Aluminum	42900	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7439-89-6	Iron	37200	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7439-92-1	Lead	11.9	=	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7439-95-4	Magnesium	5130	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7439-96-5	Manganese	851	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-02-0	Nickel	18.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-09-7	Potassium	7870	J	MG/KG	50	500	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-23-5	Sodium	254	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-28-0	Thallium	0.26	J	MG/KG	0.25	0.75	6020	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-38-2	Arsenic	6.1	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-39-3	Barium	97.6	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-41-7	Beryllium	1.1	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-43-9	Cadmium	0.28	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-47-3	Chromium	59.3	J	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-48-4	Cobalt	8.4	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-50-8	Copper	21.7	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-62-2	Vanadium	59.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-66-6	Zinc	39.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7440-70-2	Calcium	14400	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU03	VEECA-6SMI03-0211	0	0.17	16-Feb-11	SMI	7782-49-2	Selenium	1.1	J	MG/KG	1	3	6020	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.12	U	MG/KG	0.05	0.25	7196A	FALSE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	32300	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	25900	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	9.2	J	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	5100	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	544	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	11.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	7580	=	MG/KG	50	500	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	259	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	4.1	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	70.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.76	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.23	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	37.1	=	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	6.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	10.5	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	41.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	25.3	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	21300	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU04	VEECA-6SMI04-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	1.2	J	MG/KG	1	3	6020	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.056	=	MG/KG	0.01	0.05	7196A	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	15800	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	12400	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	4.8	J	MG/KG	1.3	5	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	4560	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	411	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	7.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	3810	=	MG/KG	50	500	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	238	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	4.6	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	39.5	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.32	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.23	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	20.3	=	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	4.1	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	12.2	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	24.7	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	18.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	43200	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU05	VEECA-6SMI05-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	6960	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	5980	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	1.3	J	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	6150	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	364	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	4.4	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	1240	=	MG/KG	50	500	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	178	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	2.8	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	39.3	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	10.9	=	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	2.4	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	12.3	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	15.7	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	13.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	123000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU06	VEECA-6SMI06-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	1.5	J	MG/KG	1	3	6020	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	34800	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	29200	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	10	=	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	5310	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	660	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	15.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	7900	J	MG/KG	50	500	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	257	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	5.6	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	82.2	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.82	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.25	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	48.9	J	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	7.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	20	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	44.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	27.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	20200	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU07	VEECA-6SMI07-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	2.4	J	MG/KG	1	3	6020	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.12	U	MG/KG	0.05	0.25	7196A	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	5110	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	6020	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	4	J	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	8610	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	205	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	3.6	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	1380	=	MG/KG	50	500	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	265	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	0.98	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	30.1	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	7.1	=	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	2.3	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	14.7	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	15.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	19.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	102000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU08	VEECA-6SMI08-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	11300	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	10700	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	2.7	J	MG/KG	1.3	5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	28200	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	356	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	1650	J	MG/KG	50	500	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	223	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	5.9	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	30.1	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.15	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	24.5	J	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	3.1	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	15.7	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	33.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	20.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	99600	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU09	VEECA-6SMI09-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7429-90-5	Aluminum	5380	=	MG/KG	28	100	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7439-89-6	Iron	5860	=	MG/KG	5.5	50	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7439-95-4	Magnesium	11400	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7439-96-5	Manganese	317	=	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-02-0	Nickel	3.9	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-09-7	Potassium	1060	=	MG/KG	50	500	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-23-5	Sodium	163	J	MG/KG	55	500	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-38-2	Arsenic	2.7	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-39-3	Barium	59.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-43-9	Cadmium	0.25	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-47-3	Chromium	8.7	=	MG/KG	0.7	5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-48-4	Cobalt	2	J	MG/KG	1.2	5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-50-8	Copper	16.1	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-62-2	Vanadium	17.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-66-6	Zinc	23.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7440-70-2	Calcium	158000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-6DU10	VEECA-6SMI10-0211	0	0.17	17-Feb-11	SMI	7782-49-2	Selenium	1.2	J	MG/KG	1	3	6020	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	%MOIST	% Moisture	15.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	18540-29-9	Chromium (hexavalent)	0.067	J	MG/KG	0.058	0.29	7196A	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7429-90-5	Aluminum	37100	J	MG/KG	6.5	23.3	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7439-89-6	Iron	38300	=	MG/KG	6.4	58.4	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7439-92-1	Lead	56.1	J	MG/KG	0.3	1.2	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7439-95-4	Magnesium	8330	J	MG/KG	5.3	58.4	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7439-96-5	Manganese	587	=	MG/KG	1.5	5.8	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-02-0	Nickel	17.7	=	MG/KG	0.28	1.2	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-09-7	Potassium	6180	=	MG/KG	11.8	118	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-22-4	Silver	0.23	U	MG/KG	0.11	0.58	6010B	FALSE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-23-5	Sodium	293	=	MG/KG	12.8	117	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-28-0	Thallium	0.27	=	MG/KG	0.058	0.18	6020	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-36-0	Antimony	1.5	J	MG/KG	1.1	3.5	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-38-2	Arsenic	23.8	J	MG/KG	0.88	2.9	6020	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-39-3	Barium	44.2	=	MG/KG	0.14	2.3	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-41-7	Beryllium	0.85	=	MG/KG	0.035	0.35	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-43-9	Cadmium	0.092	J	MG/KG	0.035	0.35	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-47-3	Chromium	65.9	=	MG/KG	0.16	1.2	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-48-4	Cobalt	8.3	=	MG/KG	0.29	1.2	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-50-8	Copper	19.2	=	MG/KG	0.26	1.8	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-62-2	Vanadium	66.3	=	MG/KG	0.22	2.3	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-66-6	Zinc	28.8	=	MG/KG	0.22	2.3	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7440-70-2	Calcium	124000	=	MG/KG	26.3	292	6010B	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	7782-49-2	Selenium	2.7	=	MG/KG	0.58	1.8	6020	TRUE
VEECA-4SS01	VEECA-4SS01-0001-0211	0	1	08-Feb-11	SS	PH	pH	9.2	=	PH	0.12	0.12	9045C	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00039	U	MG/KG	0.00025	0.0048	6850	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	575	=	MG/KG	28	100	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	763	=	MG/KG	5.5	50	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	5	U	MG/KG	2.6	10	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	15000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	29.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	169	J	MG/KG	50	500	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	2530	J	MG/KG	55	500	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	1.7	J	MG/KG	1.5	5	6020	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	7.1	J	MG/KG	0.6	10	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	6.9	J	MG/KG	0.7	5	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	1.1	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	3.9	J	MG/KG	0.95	10	6010B	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	5	U	MG/KG	0.95	10	6010B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	315000	=	MG/KG	45	500	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	2.2	J	MG/KG	1	3	6020	TRUE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-1DU01	VEECA-1SMI01-0211	0	0.17	07-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.02	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0054	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00039	U	MG/KG	0.00025	0.0048	6850	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0074	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0089	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	535	=	MG/KG	28	100	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	758	=	MG/KG	5.5	50	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	5	U	MG/KG	2.6	10	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	15500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	28.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	177	J	MG/KG	50	500	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	2650	J	MG/KG	55	500	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	3	U	MG/KG	1.5	5	6020	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	7	J	MG/KG	0.6	10	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	6.8	J	MG/KG	0.7	5	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	2.5	U	MG/KG	1.1	7.5	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	3.9	J	MG/KG	0.95	10	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	5	U	MG/KG	0.95	10	6010B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	324000	=	MG/KG	45	500	6010B	TRUE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-1DU02	VEECA-1SMI02-0211	0	0.17	07-Feb-11	SMI	PH	pH	7.7	=	PH	0.1	0.1	9045C	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	%MOIST	% Moisture	2.3	=	PCT	0.1	0.1	D2216	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	14797-73-0	Perchlorate	0.00041	U	MG/KG	0.00026	0.0051	6850	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.026	U	MG/KG	0.01	0.051	7196A	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	479-45-8	Tetryl	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7429-90-5	Aluminum	402	J	MG/KG	5.7	20.5	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7439-89-6	Iron	675	=	MG/KG	5.6	51.2	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7439-92-1	Lead	0.51	U	MG/KG	0.27	1	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7439-95-4	Magnesium	14200	J	MG/KG	4.6	51.2	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7439-96-5	Manganese	25.9	=	MG/KG	1.3	5.1	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-02-0	Nickel	0.3	J	MG/KG	0.25	1	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-09-7	Potassium	107	=	MG/KG	10.2	102	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-22-4	Silver	0.2	U	MG/KG	0.092	0.51	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-23-5	Sodium	2180	=	MG/KG	11.3	102	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-28-0	Thallium	0.1	U	MG/KG	0.051	0.15	6020	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-36-0	Antimony	2	UJ	MG/KG	0.96	3.1	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-38-2	Arsenic	7.7	UJ	MG/KG	3.8	12.8	6020	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-39-3	Barium	6.6	=	MG/KG	0.12	2	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-41-7	Beryllium	0.1	U	MG/KG	0.031	0.31	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-43-9	Cadmium	0.1	UJ	MG/KG	0.031	0.31	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-47-3	Chromium	7	=	MG/KG	0.14	1	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-48-4	Cobalt	0.51	U	MG/KG	0.26	1	6010B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-50-8	Copper	0.76	J	MG/KG	0.23	1.5	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-62-2	Vanadium	3.4	=	MG/KG	0.19	2	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-66-6	Zinc	0.69	J	MG/KG	0.19	2	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7440-70-2	Calcium	318000	=	MG/KG	23	256	6010B	TRUE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	7782-49-2	Selenium	5.1	U	MG/KG	2.6	7.7	6020	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-1SB01	VEECA-1SB01-1H02-0211	1.5	2	08-Feb-11	SB	PH	pH	9.1	=	PH	0.1	0.1	9045C	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	%MOIST	% Moisture	4.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	14797-73-0	Perchlorate	0.00042	U	MG/KG	0.00027	0.0052	6850	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.026	U	MG/KG	0.01	0.052	7196A	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7429-90-5	Aluminum	380	J	MG/KG	5.8	20.9	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7439-89-6	Iron	696	J	MG/KG	5.7	52.2	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7439-92-1	Lead	0.52	U	MG/KG	0.27	1	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7439-95-4	Magnesium	13900	J	MG/KG	4.7	52.2	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7439-96-5	Manganese	24.8	=	MG/KG	1.3	5.2	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-02-0	Nickel	0.26	J	MG/KG	0.25	1	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-09-7	Potassium	107	=	MG/KG	10.4	104	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-22-4	Silver	0.21	U	MG/KG	0.094	0.52	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-23-5	Sodium	2160	J	MG/KG	11.5	104	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-28-0	Thallium	0.1	U	MG/KG	0.052	0.16	6020	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-36-0	Antimony	2.1	UJ	MG/KG	0.98	3.1	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-38-2	Arsenic	7.8	UJ	MG/KG	3.9	13.1	6020	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-39-3	Barium	6.1	=	MG/KG	0.13	2.1	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-41-7	Beryllium	0.1	U	MG/KG	0.031	0.31	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-43-9	Cadmium	0.1	UJ	MG/KG	0.031	0.31	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-47-3	Chromium	6.9	J	MG/KG	0.15	1	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-48-4	Cobalt	0.52	U	MG/KG	0.26	1	6010B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-50-8	Copper	0.66	J	MG/KG	0.23	1.6	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-62-2	Vanadium	3.6	=	MG/KG	0.2	2.1	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-66-6	Zinc	0.57	J	MG/KG	0.2	2.1	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7440-70-2	Calcium	312000	=	MG/KG	23.5	261	6010B	TRUE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	7782-49-2	Selenium	5.2	U	MG/KG	2.6	7.8	6020	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-1SB02	VEECA-1SB02-1H02-0211	1.5	2	08-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.005	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.00027	J	MG/KG	0.00025	0.0048	6850	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.057	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0069	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	11900	=	MG/KG	28	100	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	17800	=	MG/KG	5.5	50	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	7500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	422	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	10.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	2380	=	MG/KG	50	500	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	7230	J	MG/KG	55	500	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	3.9	J	MG/KG	1.5	5	6020	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	73.2	=	MG/KG	0.6	10	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	31.5	=	MG/KG	0.7	5	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	8.9	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	16.1	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	61.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	22.8	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	108000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.057	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-3DU01	VEECA-3SMI01-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.6	=	PH	0.1	0.1	9045C	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.00038	U	MG/KG	0.00025	0.0048	6850	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	10700	=	MG/KG	28	100	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	12900	=	MG/KG	5.5	50	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	6610	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	203	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	7.1	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	2890	=	MG/KG	50	500	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	8570	J	MG/KG	55	500	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	4.8	J	MG/KG	1.5	5	6020	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	17.2	=	MG/KG	0.6	10	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	24.3	=	MG/KG	0.7	5	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	11.1	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	45.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	16.1	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	152000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-3DU02	VEECA-3SMI02-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.00039	U	MG/KG	0.00025	0.0049	6850	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	5660	=	MG/KG	28	100	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	4620	=	MG/KG	5.5	50	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	8050	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	87.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	2.6	J	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	1690	=	MG/KG	50	500	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	7260	J	MG/KG	55	500	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	3	U	MG/KG	1.5	5	6020	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	12.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	11.2	=	MG/KG	0.7	5	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	1.5	J	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	6.4	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	13.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	7.6	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	246000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3DU03	VEECA-3SMI03-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.7	=	PH	0.1	0.1	9045C	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.005	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.00039	U	MG/KG	0.00025	0.0049	6850	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.056	U	MG/KG	0.014	0.47	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0069	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0083	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	7130	=	MG/KG	28	100	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	8040	=	MG/KG	5.5	50	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	9890	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	174	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	4	J	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	1770	=	MG/KG	50	500	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	7860	J	MG/KG	55	500	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	1.9	J	MG/KG	1.5	5	6020	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	11.9	=	MG/KG	0.6	10	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	15.7	=	MG/KG	0.7	5	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	3.4	J	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	7.9	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	23.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	11.9	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	259000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.056	U	MG/KG	0.024	0.47	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.0039	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-3DU04	VEECA-3SMI04-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.8	=	PH	0.1	0.1	9045C	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.00041	U	MG/KG	0.00027	0.0052	6850	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.007	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	1840	=	MG/KG	28	100	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	1840	=	MG/KG	5.5	50	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	9890	=	MG/KG	22.5	250	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	52.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	625	=	MG/KG	50	500	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	7620	J	MG/KG	55	500	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	3	U	MG/KG	1.5	5	6020	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	9.1	J	MG/KG	0.6	10	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	6.6	=	MG/KG	0.7	5	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	3.1	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	6.6	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	3.8	J	MG/KG	0.95	10	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	290000	=	MG/KG	45	500	6010B	TRUE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-3DU05	VEECA-3SMI05-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.7	=	PH	0.1	0.1	9045C	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	%MOIST	% Moisture	24.7	=	PCT	0.1	0.1	D2216	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	14797-73-0	Perchlorate	0.00051	U	MG/KG	0.00033	0.0064	6850	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.033	U	MG/KG	0.013	0.066	7196A	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7429-90-5	Aluminum	1940	=	MG/KG	7.4	26.5	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7439-89-6	Iron	1560	=	MG/KG	1.5	13.3	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7439-92-1	Lead	3.3	U	MG/KG	1.7	6.6	6010B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7439-95-4	Magnesium	9080	J	MG/KG	6	66.4	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7439-96-5	Manganese	47.4	=	MG/KG	0.33	1.3	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-02-0	Nickel	0.84	J	MG/KG	0.32	1.3	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-09-7	Potassium	550	=	MG/KG	13.3	133	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-22-4	Silver	0.27	UJ	MG/KG	0.12	0.66	6010B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-23-5	Sodium	4040	=	MG/KG	14.6	133	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-28-0	Thallium	0.13	U	MG/KG	0.066	0.2	6020	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-36-0	Antimony	2.7	U	MG/KG	1.2	4	6010B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-38-2	Arsenic	2	U	MG/KG	1	3.3	6020	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-39-3	Barium	9.6	=	MG/KG	0.16	2.7	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-41-7	Beryllium	0.13	UJ	MG/KG	0.04	0.4	6010B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-43-9	Cadmium	0.13	U	MG/KG	0.04	0.4	6010B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-47-3	Chromium	8.5	=	MG/KG	0.19	1.3	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-48-4	Cobalt	0.36	J	MG/KG	0.33	1.3	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-50-8	Copper	2.7	=	MG/KG	0.29	2	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-62-2	Vanadium	4.7	=	MG/KG	0.25	2.7	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-66-6	Zinc	3	J	MG/KG	0.25	2.7	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7440-70-2	Calcium	328000	=	MG/KG	59.7	664	6010B	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	7782-49-2	Selenium	0.7	=	MG/KG	0.13	0.4	6020	TRUE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3SB01	VEECA-3SB01-0001-0211	0	1	11-Feb-11	SB	PH	pH	10.4	=	PH	0.13	0.13	9045C	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	%MOIST	% Moisture	22.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	14797-73-0	Perchlorate	0.00048	U	MG/KG	0.00031	0.006	6850	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.03	U	MG/KG	0.012	0.06	7196A	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7429-90-5	Aluminum	16000	=	MG/KG	6.8	24.2	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7439-89-6	Iron	16800	=	MG/KG	1.3	12.1	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7439-92-1	Lead	0.6	U	MG/KG	0.31	1.2	6010B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7439-95-4	Magnesium	6310	J	MG/KG	5.4	60.4	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7439-96-5	Manganese	149	=	MG/KG	0.3	1.2	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-02-0	Nickel	10	=	MG/KG	0.29	1.2	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-09-7	Potassium	4500	=	MG/KG	12.1	121	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-22-4	Silver	0.24	UJ	MG/KG	0.11	0.6	6010B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-23-5	Sodium	4570	=	MG/KG	13.3	121	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-28-0	Thallium	0.093	J	MG/KG	0.06	0.18	6020	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-36-0	Antimony	2.4	U	MG/KG	1.1	3.6	6010B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-38-2	Arsenic	13.5	=	MG/KG	0.18	0.6	6020	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-39-3	Barium	13	=	MG/KG	0.14	2.4	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-41-7	Beryllium	0.13	J	MG/KG	0.036	0.36	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-43-9	Cadmium	0.12	U	MG/KG	0.036	0.36	6010B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-47-3	Chromium	31.3	=	MG/KG	0.17	1.2	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-48-4	Cobalt	6.7	=	MG/KG	0.3	1.2	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-50-8	Copper	13.3	=	MG/KG	0.27	1.8	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-62-2	Vanadium	49.2	=	MG/KG	0.23	2.4	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-66-6	Zinc	18.8	J	MG/KG	0.23	2.4	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7440-70-2	Calcium	179000	=	MG/KG	54.3	604	6010B	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	7782-49-2	Selenium	0.57	=	MG/KG	0.12	0.36	6020	TRUE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3SB02	VEECA-3SB02-0001-0211	0	1	11-Feb-11	SB	PH	pH	9.6	=	PH	0.12	0.12	9045C	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	%MOIST	% Moisture	18.3	=	PCT	0.1	0.1	D2216	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	14797-73-0	Perchlorate	0.00045	U	MG/KG	0.00029	0.0056	6850	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.031	U	MG/KG	0.012	0.061	7196A	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7429-90-5	Aluminum	20200	=	MG/KG	6.9	24.5	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7439-89-6	Iron	21500	=	MG/KG	1.3	12.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7439-92-1	Lead	0.61	U	MG/KG	0.32	1.2	6010B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7439-95-4	Magnesium	7020	J	MG/KG	5.5	61.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7439-96-5	Manganese	537	=	MG/KG	0.31	1.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-02-0	Nickel	11.2	=	MG/KG	0.29	1.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-09-7	Potassium	3870	=	MG/KG	12.2	122	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-22-4	Silver	0.24	UJ	MG/KG	0.11	0.61	6010B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-23-5	Sodium	3010	=	MG/KG	13.5	122	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-28-0	Thallium	0.077	J	MG/KG	0.061	0.18	6020	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-36-0	Antimony	2.4	U	MG/KG	1.2	3.7	6010B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-38-2	Arsenic	7.1	=	MG/KG	0.18	0.61	6020	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-39-3	Barium	21.9	=	MG/KG	0.15	2.4	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-41-7	Beryllium	0.18	J	MG/KG	0.037	0.37	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-43-9	Cadmium	0.12	U	MG/KG	0.037	0.37	6010B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-47-3	Chromium	37.5	=	MG/KG	0.17	1.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-48-4	Cobalt	9.1	=	MG/KG	0.31	1.2	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-50-8	Copper	20.3	=	MG/KG	0.27	1.8	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-62-2	Vanadium	66.7	=	MG/KG	0.23	2.4	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-66-6	Zinc	26.4	J	MG/KG	0.23	2.4	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7440-70-2	Calcium	164000	=	MG/KG	55.1	612	6010B	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	7782-49-2	Selenium	0.52	=	MG/KG	0.12	0.37	6020	TRUE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-3SB03	VEECA-3SB03-0002-0211	0	2	10-Feb-11	SB	PH	pH	9.5	=	PH	0.12	0.12	9045C	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	%MOIST	% Moisture	20	=	PCT	0.1	0.1	D2216	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	14797-73-0	Perchlorate	0.0005	U	MG/KG	0.00032	0.0062	6850	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.031	U	MG/KG	0.013	0.063	7196A	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7429-90-5	Aluminum	1910	=	MG/KG	7	25	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7439-89-6	Iron	4660	=	MG/KG	1.4	12.5	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7439-92-1	Lead	3.1	U	MG/KG	1.6	6.3	6010B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7439-95-4	Magnesium	10400	=	MG/KG	5.6	62.5	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7439-96-5	Manganese	56.5	=	MG/KG	0.31	1.3	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-02-0	Nickel	1.1	J	MG/KG	0.3	1.3	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-09-7	Potassium	511	=	MG/KG	12.5	125	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-22-4	Silver	0.25	U	MG/KG	0.11	0.63	6010B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-23-5	Sodium	4280	=	MG/KG	13.8	125	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-28-0	Thallium	0.13	U	MG/KG	0.063	0.19	6020	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-36-0	Antimony	2.5	U	MG/KG	1.2	3.8	6010B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-38-2	Arsenic	1.9	UJ	MG/KG	0.94	3.1	6020	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-39-3	Barium	10.4	=	MG/KG	0.15	2.5	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-41-7	Beryllium	0.13	U	MG/KG	0.038	0.38	6010B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-43-9	Cadmium	0.063	J	MG/KG	0.038	0.38	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-47-3	Chromium	8.2	=	MG/KG	0.18	1.3	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-48-4	Cobalt	0.5	J	MG/KG	0.31	1.3	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-50-8	Copper	3.7	=	MG/KG	0.28	1.9	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-62-2	Vanadium	8	=	MG/KG	0.24	2.5	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-66-6	Zinc	5.9	=	MG/KG	0.24	2.5	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7440-70-2	Calcium	338000	=	MG/KG	28.1	313	6010B	TRUE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	7782-49-2	Selenium	1.3	U	MG/KG	0.63	1.9	6020	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3SB04	VEECA-3SB04-001H-0211	0	1.5	14-Feb-11	SB	PH	pH	9.6	=	PH	0.13	0.13	9045C	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	%MOIST	% Moisture	10.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	14797-73-0	Perchlorate	0.00044	U	MG/KG	0.00029	0.0055	6850	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.028	U	MG/KG	0.011	0.056	7196A	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7429-90-5	Aluminum	975	=	MG/KG	6.3	22.3	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7439-89-6	Iron	1720	=	MG/KG	1.2	11.2	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7439-92-1	Lead	0.56	U	MG/KG	0.29	1.1	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7439-95-4	Magnesium	10400	J	MG/KG	5	55.8	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7439-96-5	Manganese	46.7	=	MG/KG	0.28	1.1	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-02-0	Nickel	0.49	J	MG/KG	0.27	1.1	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-09-7	Potassium	240	=	MG/KG	11.2	112	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-22-4	Silver	0.22	UJ	MG/KG	0.1	0.56	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-23-5	Sodium	2720	=	MG/KG	12.3	112	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-28-0	Thallium	0.11	U	MG/KG	0.056	0.17	6020	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-36-0	Antimony	2.2	U	MG/KG	1	3.3	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-38-2	Arsenic	1.7	U	MG/KG	0.84	2.8	6020	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-39-3	Barium	8.1	=	MG/KG	0.13	2.2	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-41-7	Beryllium	0.11	UJ	MG/KG	0.033	0.33	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-43-9	Cadmium	0.11	U	MG/KG	0.033	0.33	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-47-3	Chromium	6.7	=	MG/KG	0.16	1.1	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-48-4	Cobalt	0.56	U	MG/KG	0.28	1.1	6010B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-50-8	Copper	2.2	=	MG/KG	0.25	1.7	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-62-2	Vanadium	4.4	=	MG/KG	0.21	2.2	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-66-6	Zinc	3	J	MG/KG	0.21	2.2	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7440-70-2	Calcium	334000	=	MG/KG	50.2	558	6010B	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	7782-49-2	Selenium	0.4	=	MG/KG	0.11	0.33	6020	TRUE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-3SB05	VEECA-3SB05-0002-0211	0	2	10-Feb-11	SB	PH	pH	8.9	=	PH	0.11	0.11	9045C	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	49.5	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00074	U	MG/KG	0.00048	0.0093	6850	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.05	U	MG/KG	0.02	0.099	7196A	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	17700	=	MG/KG	11.1	39.6	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	18200	=	MG/KG	2.2	19.8	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.99	U	MG/KG	0.52	2	6010B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	15800	=	MG/KG	8.9	99.1	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	418	=	MG/KG	0.5	2	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	10	=	MG/KG	0.48	2	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	6160	=	MG/KG	19.8	198	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.4	U	MG/KG	0.18	0.99	6010B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	18800	=	MG/KG	21.8	198	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.2	U	MG/KG	0.099	0.3	6020	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	4	UJ	MG/KG	1.9	5.9	6010B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	3.3	J	MG/KG	1.5	5	6020	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	29.6	=	MG/KG	0.24	4	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.086	J	MG/KG	0.059	0.59	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.16	J	MG/KG	0.059	0.59	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	32.4	=	MG/KG	0.28	2	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7.5	=	MG/KG	0.5	2	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	22.3	=	MG/KG	0.44	3	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	51.6	=	MG/KG	0.38	4	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	28.4	=	MG/KG	0.38	4	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	196000	=	MG/KG	44.6	495	6010B	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2	J	MG/KG	0.99	3	6020	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	15.9	=	PH	0.2	0.2	9045C	TRUE
VEECA-5SD01	VEECA-5SD01-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	11400	=	MG/KG	502	3280	LLOYD_KAHN	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	32.6	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00055	U	MG/KG	0.00036	0.0069	6850	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.036	U	MG/KG	0.014	0.072	7196A	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	16100	=	MG/KG	8.1	28.9	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	13900	=	MG/KG	1.6	14.5	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.72	U	MG/KG	0.38	1.4	6010B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	14500	=	MG/KG	6.5	72.4	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	429	=	MG/KG	0.36	1.4	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	7.5	=	MG/KG	0.35	1.4	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5630	=	MG/KG	14.5	145	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.29	U	MG/KG	0.13	0.72	6010B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	4510	=	MG/KG	15.9	145	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.14	U	MG/KG	0.072	0.22	6020	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.9	UJ	MG/KG	1.4	4.3	6010B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.2	U	MG/KG	1.1	3.6	6020	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	29.2	=	MG/KG	0.17	2.9	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.14	U	MG/KG	0.043	0.43	6010B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.046	J	MG/KG	0.043	0.43	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	28.4	=	MG/KG	0.2	1.4	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	5.4	=	MG/KG	0.36	1.4	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	12.6	=	MG/KG	0.32	2.2	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	36.3	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	19.4	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	246000	=	MG/KG	32.6	362	6010B	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.2	=	MG/KG	0.72	2.2	6020	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.4	=	PH	0.14	0.14	9045C	TRUE
VEECA-5SD02	VEECA-5SD02-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	30600	=	MG/KG	358	1450	LLOYD_KAHN	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	33.8	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00057	U	MG/KG	0.00037	0.0072	6850	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.038	U	MG/KG	0.015	0.076	7196A	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	15900	=	MG/KG	8.5	30.2	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	15200	=	MG/KG	1.7	15.1	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.76	U	MG/KG	0.39	1.5	6010B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	16200	=	MG/KG	6.8	75.5	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	462	=	MG/KG	0.38	1.5	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	8.9	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5480	=	MG/KG	15.1	151	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.3	U	MG/KG	0.14	0.76	6010B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5590	=	MG/KG	16.6	151	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.076	0.23	6020	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	3	UJ	MG/KG	1.4	4.5	6010B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2	J	MG/KG	1.1	3.8	6020	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	37.3	=	MG/KG	0.18	3	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.066	J	MG/KG	0.045	0.45	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.15	U	MG/KG	0.045	0.45	6010B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	29	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	6.8	=	MG/KG	0.38	1.5	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	17	=	MG/KG	0.33	2.3	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	44.2	=	MG/KG	0.29	3	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	22.2	=	MG/KG	0.29	3	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	208000	=	MG/KG	34	378	6010B	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	1.9	J	MG/KG	0.76	2.3	6020	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.6	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD03	VEECA-5SD03-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	4850	=	MG/KG	374	2590	LLOYD_KAHN	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	26.7	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.0005	U	MG/KG	0.00033	0.0063	6850	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.034	U	MG/KG	0.014	0.068	7196A	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	9450	=	MG/KG	7.6	27.3	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	8680	=	MG/KG	1.5	13.6	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	3.4	U	MG/KG	1.8	6.8	6010B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	14000	=	MG/KG	6.1	68.2	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	355	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	4.8	=	MG/KG	0.33	1.4	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	3290	=	MG/KG	13.6	136	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.27	U	MG/KG	0.12	0.68	6010B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5290	=	MG/KG	15	136	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.14	U	MG/KG	0.068	0.2	6020	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.7	UJ	MG/KG	1.3	4.1	6010B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2	U	MG/KG	1	3.4	6020	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	26.1	=	MG/KG	0.16	2.7	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.14	U	MG/KG	0.041	0.41	6010B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.054	J	MG/KG	0.041	0.41	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	18.2	=	MG/KG	0.19	1.4	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	4	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	9.2	=	MG/KG	0.3	2	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	27	=	MG/KG	0.26	2.7	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	12.4	=	MG/KG	0.26	2.7	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	260000	=	MG/KG	30.7	341	6010B	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	0.77	J	MG/KG	0.68	2	6020	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.3	=	PH	0.14	0.14	9045C	TRUE
VEECA-5SD04	VEECA-5SD04-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	15200	=	MG/KG	343	2450	LLOYD_KAHN	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	33.1	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00056	U	MG/KG	0.00037	0.007	6850	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.037	U	MG/KG	0.015	0.075	7196A	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	20000	=	MG/KG	8.4	29.9	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	17700	=	MG/KG	1.6	15	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.75	U	MG/KG	0.39	1.5	6010B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	17900	=	MG/KG	6.7	74.8	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	571	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	10.4	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	6450	=	MG/KG	15	150	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.3	U	MG/KG	0.13	0.75	6010B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5810	=	MG/KG	16.5	150	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.081	J	MG/KG	0.075	0.22	6020	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	3	UJ	MG/KG	1.4	4.5	6010B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	1.9	J	MG/KG	1.1	3.7	6020	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	32.7	=	MG/KG	0.18	3	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.09	J	MG/KG	0.045	0.45	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.058	J	MG/KG	0.045	0.45	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	35.5	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7.9	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	17.6	=	MG/KG	0.33	2.2	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	53.4	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	25.8	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	246000	=	MG/KG	33.7	374	6010B	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.7	=	MG/KG	0.75	2.2	6020	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.5	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD05	VEECA-5SD05-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	5260	=	MG/KG	374	2610	LLOYD_KAHN	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	29	=	PCT	0.1	0.1	D2216	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00055	U	MG/KG	0.00036	0.0069	6850	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.035	U	MG/KG	0.014	0.07	7196A	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	17100	=	MG/KG	7.9	28.2	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	16400	=	MG/KG	1.6	14.1	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.7	U	MG/KG	0.37	1.4	6010B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	16800	=	MG/KG	6.3	70.5	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	538	=	MG/KG	0.35	1.4	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	9.3	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5810	=	MG/KG	14.1	141	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.28	U	MG/KG	0.13	0.7	6010B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5030	=	MG/KG	15.5	141	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.14	U	MG/KG	0.07	0.21	6020	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.8	UJ	MG/KG	1.3	4.2	6010B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	1.6	J	MG/KG	1.1	3.5	6020	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	30.3	=	MG/KG	0.17	2.8	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.083	J	MG/KG	0.042	0.42	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.071	J	MG/KG	0.042	0.42	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	31.6	=	MG/KG	0.2	1.4	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7.4	=	MG/KG	0.35	1.4	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	16.8	=	MG/KG	0.31	2.1	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	48.4	=	MG/KG	0.27	2.8	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	25.1	=	MG/KG	0.27	2.8	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	225000	=	MG/KG	31.7	352	6010B	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.3	=	MG/KG	0.7	2.1	6020	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.8	=	PH	0.14	0.14	9045C	TRUE
VEECA-5SD06	VEECA-5SD06-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	4620	=	MG/KG	368	2770	LLOYD_KAHN	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	34.5	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00055	U	MG/KG	0.00036	0.0069	6850	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.038	U	MG/KG	0.015	0.076	7196A	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	17300	=	MG/KG	8.5	30.5	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	16500	=	MG/KG	1.7	15.3	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.76	U	MG/KG	0.4	1.5	6010B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	15800	=	MG/KG	6.9	76.3	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	482	=	MG/KG	0.38	1.5	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	9.5	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5490	=	MG/KG	15.3	153	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.31	U	MG/KG	0.14	0.76	6010B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5770	=	MG/KG	16.8	153	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.076	0.23	6020	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	3.1	UJ	MG/KG	1.4	4.6	6010B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	1.7	J	MG/KG	1.1	3.8	6020	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	31.2	=	MG/KG	0.18	3.1	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.085	J	MG/KG	0.046	0.46	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.06	J	MG/KG	0.046	0.46	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	31.7	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7.3	=	MG/KG	0.38	1.5	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	17.5	=	MG/KG	0.34	2.3	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	47.8	=	MG/KG	0.29	3.1	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	24	=	MG/KG	0.29	3.1	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	208000	=	MG/KG	34.4	382	6010B	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.1	J	MG/KG	0.76	2.3	6020	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.7	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD07	VEECA-5SD07-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	20400	=	MG/KG	388	1380	LLOYD_KAHN	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	33.1	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00054	U	MG/KG	0.00035	0.0067	6850	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.037	U	MG/KG	0.015	0.075	7196A	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	16700	=	MG/KG	8.4	29.9	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	15700	=	MG/KG	1.6	14.9	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.75	U	MG/KG	0.39	1.5	6010B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	15000	=	MG/KG	6.7	74.7	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	496	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	9	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5350	=	MG/KG	14.9	149	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.3	U	MG/KG	0.13	0.75	6010B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5860	=	MG/KG	16.4	149	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.075	0.22	6020	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	3	UJ	MG/KG	1.4	4.5	6010B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.4	J	MG/KG	1.1	3.7	6020	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	34.3	=	MG/KG	0.18	3	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.078	J	MG/KG	0.045	0.45	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.059	J	MG/KG	0.045	0.45	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	30.8	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	6.9	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	15	=	MG/KG	0.33	2.2	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	47	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	23.2	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	209000	=	MG/KG	33.6	374	6010B	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	0.75	J	MG/KG	0.75	2.2	6020	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.4	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD08	VEECA-5SD08-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	17200	=	MG/KG	359	1370	LLOYD_KAHN	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	32.2	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.02	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0054	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00056	U	MG/KG	0.00036	0.007	6850	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.037	U	MG/KG	0.015	0.074	7196A	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0074	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0089	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	19000	=	MG/KG	8.3	29.5	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	17900	=	MG/KG	1.6	14.7	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.74	U	MG/KG	0.38	1.5	6010B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	17000	=	MG/KG	6.6	73.7	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	522	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	10.8	=	MG/KG	0.35	1.5	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	6490	=	MG/KG	14.7	147	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.29	U	MG/KG	0.13	0.74	6010B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	6100	=	MG/KG	16.2	147	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.074	0.22	6020	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.9	UJ	MG/KG	1.4	4.4	6010B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.9	J	MG/KG	1.1	3.7	6020	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	35.5	=	MG/KG	0.18	2.9	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.11	J	MG/KG	0.044	0.44	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.16	J	MG/KG	0.044	0.44	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	34.3	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	8.3	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	25.9	=	MG/KG	0.32	2.2	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	52.6	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	27.2	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	209000	=	MG/KG	33.2	369	6010B	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.4	=	MG/KG	0.74	2.2	6020	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.061	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.3	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD09	VEECA-5SD09-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	14000	=	MG/KG	372	1450	LLOYD_KAHN	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	31.1	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00056	U	MG/KG	0.00036	0.007	6850	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.036	U	MG/KG	0.015	0.073	7196A	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	16600	=	MG/KG	8.1	29	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	15500	=	MG/KG	1.6	14.5	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.73	U	MG/KG	0.38	1.5	6010B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	14300	=	MG/KG	6.5	72.5	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	454	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	9	=	MG/KG	0.35	1.5	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	5820	=	MG/KG	14.5	145	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.29	U	MG/KG	0.13	0.73	6010B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	6290	=	MG/KG	16	145	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.073	0.22	6020	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.9	UJ	MG/KG	1.4	4.4	6010B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.4	J	MG/KG	1.1	3.6	6020	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	32.8	=	MG/KG	0.17	2.9	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.08	J	MG/KG	0.044	0.44	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.084	J	MG/KG	0.044	0.44	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	30.2	=	MG/KG	0.2	1.5	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	6.7	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	14	=	MG/KG	0.32	2.2	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	40.5	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	22.1	=	MG/KG	0.28	2.9	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	211000	=	MG/KG	32.6	363	6010B	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	1.9	J	MG/KG	0.73	2.2	6020	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.9	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD10	VEECA-5SD10-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	14000	=	MG/KG	359	1430	LLOYD_KAHN	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	27.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.0005	U	MG/KG	0.00033	0.0063	6850	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.033	U	MG/KG	0.013	0.065	7196A	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	10900	=	MG/KG	7.3	26.1	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	9970	=	MG/KG	1.4	13.1	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.65	U	MG/KG	0.34	1.3	6010B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	9170	=	MG/KG	5.9	65.3	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	324	=	MG/KG	0.33	1.3	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	5.9	=	MG/KG	0.31	1.3	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	3480	=	MG/KG	13.1	131	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.26	U	MG/KG	0.12	0.65	6010B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	4100	=	MG/KG	14.4	131	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.13	U	MG/KG	0.065	0.2	6020	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.6	UJ	MG/KG	1.2	3.9	6010B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.5	J	MG/KG	0.98	3.3	6020	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	18.3	=	MG/KG	0.16	2.6	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.13	U	MG/KG	0.039	0.39	6010B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.068	J	MG/KG	0.039	0.39	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	22.5	=	MG/KG	0.18	1.3	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	4.6	=	MG/KG	0.33	1.3	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	12	=	MG/KG	0.29	2	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	32.7	=	MG/KG	0.25	2.6	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	14.2	=	MG/KG	0.25	2.6	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	250000	=	MG/KG	29.4	327	6010B	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.1	J	MG/KG	0.65	2	6020	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.6	=	PH	0.13	0.13	9045C	TRUE
VEECA-5SD11	VEECA-5SD11-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	31100	=	MG/KG	322	1180	LLOYD_KAHN	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	32.5	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00055	U	MG/KG	0.00035	0.0068	6850	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.037	U	MG/KG	0.015	0.074	7196A	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	7180	=	MG/KG	8.3	29.6	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	8180	=	MG/KG	1.6	14.8	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.74	U	MG/KG	0.39	1.5	6010B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	8750	=	MG/KG	6.7	74.1	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	274	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	5	=	MG/KG	0.36	1.5	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	2240	=	MG/KG	14.8	148	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.3	U	MG/KG	0.13	0.74	6010B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	5020	=	MG/KG	16.3	148	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.15	U	MG/KG	0.074	0.22	6020	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	3	UJ	MG/KG	1.4	4.4	6010B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	1.7	J	MG/KG	1.1	3.7	6020	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	16.2	=	MG/KG	0.18	3	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.15	U	MG/KG	0.044	0.44	6010B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.075	J	MG/KG	0.044	0.44	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	17.8	=	MG/KG	0.21	1.5	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	3.8	=	MG/KG	0.37	1.5	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	8.9	=	MG/KG	0.33	2.2	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	29.9	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	12.8	=	MG/KG	0.28	3	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	190000	=	MG/KG	33.3	370	6010B	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	1.6	J	MG/KG	0.74	2.2	6020	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	12.1	=	PH	0.15	0.15	9045C	TRUE
VEECA-5SD12	VEECA-5SD12-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	18400	=	MG/KG	353	1440	LLOYD_KAHN	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	26.7	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00055	U	MG/KG	0.00036	0.0069	6850	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.034	U	MG/KG	0.014	0.068	7196A	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	7520	=	MG/KG	7.6	27.3	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	10400	=	MG/KG	1.5	13.6	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.68	U	MG/KG	0.35	1.4	6010B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	9050	=	MG/KG	6.1	68.2	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	340	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	6.3	=	MG/KG	0.33	1.4	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	1730	=	MG/KG	13.6	136	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.27	U	MG/KG	0.12	0.68	6010B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	3350	=	MG/KG	15	136	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.14	U	MG/KG	0.068	0.2	6020	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.7	UJ	MG/KG	1.3	4.1	6010B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	3	J	MG/KG	1	3.4	6020	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	19.2	=	MG/KG	0.16	2.7	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.14	U	MG/KG	0.041	0.41	6010B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.15	J	MG/KG	0.041	0.41	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	17.7	=	MG/KG	0.19	1.4	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	5.1	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	12	=	MG/KG	0.3	2	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	43.5	=	MG/KG	0.26	2.7	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	13.9	=	MG/KG	0.26	2.7	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	213000	=	MG/KG	30.7	341	6010B	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	0.83	J	MG/KG	0.68	2	6020	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.1	=	PH	0.14	0.14	9045C	TRUE
VEECA-5SD13	VEECA-5SD13-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	15500	=	MG/KG	338	1390	LLOYD_KAHN	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	26.5	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.00052	U	MG/KG	0.00034	0.0065	6850	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.019	J	MG/KG	0.014	0.068	7196A	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	14300	=	MG/KG	7.6	27.2	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	15700	=	MG/KG	1.5	13.6	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.68	U	MG/KG	0.35	1.4	6010B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	13800	=	MG/KG	6.1	68	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	498	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	8.6	=	MG/KG	0.33	1.4	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	4370	=	MG/KG	13.6	136	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.27	U	MG/KG	0.12	0.68	6010B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	4730	=	MG/KG	15	136	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.14	U	MG/KG	0.068	0.2	6020	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.7	UJ	MG/KG	1.3	4.1	6010B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.1	J	MG/KG	1	3.4	6020	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	48.4	=	MG/KG	0.16	2.7	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.054	J	MG/KG	0.041	0.41	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.053	J	MG/KG	0.041	0.41	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	27	=	MG/KG	0.19	1.4	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7	=	MG/KG	0.34	1.4	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	12.8	=	MG/KG	0.3	2	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	47.9	=	MG/KG	0.26	2.7	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	18.8	=	MG/KG	0.26	2.7	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	205000	=	MG/KG	30.6	340	6010B	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	2.3	=	MG/KG	0.68	2	6020	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	11.4	=	PH	0.14	0.14	9045C	TRUE
VEECA-5SD14	VEECA-5SD14-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	11300	=	MG/KG	345	1310	LLOYD_KAHN	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	%MOIST	% Moisture	24.4	=	PCT	0.1	0.1	D2216	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.02	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0054	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	14797-73-0	Perchlorate	0.0005	U	MG/KG	0.00033	0.0063	6850	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	18540-29-9	Chromium (hexavalent)	0.019	J	MG/KG	0.013	0.066	7196A	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0074	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0089	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7429-90-5	Aluminum	10900	=	MG/KG	7.4	26.5	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7439-89-6	Iron	15900	=	MG/KG	1.5	13.2	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7439-92-1	Lead	0.66	U	MG/KG	0.34	1.3	6010B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7439-95-4	Magnesium	9460	=	MG/KG	6	66.1	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7439-96-5	Manganese	390	=	MG/KG	0.33	1.3	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-02-0	Nickel	9.3	=	MG/KG	0.32	1.3	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-09-7	Potassium	1870	=	MG/KG	13.2	132	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-22-4	Silver	0.26	U	MG/KG	0.12	0.66	6010B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-23-5	Sodium	3030	=	MG/KG	14.6	132	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-28-0	Thallium	0.13	U	MG/KG	0.066	0.2	6020	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-36-0	Antimony	2.6	UJ	MG/KG	1.2	4	6010B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-38-2	Arsenic	2.4	J	MG/KG	0.99	3.3	6020	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-39-3	Barium	33.4	=	MG/KG	0.16	2.6	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-41-7	Beryllium	0.056	J	MG/KG	0.04	0.4	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-43-9	Cadmium	0.066	J	MG/KG	0.04	0.4	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-47-3	Chromium	28.4	=	MG/KG	0.19	1.3	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-48-4	Cobalt	7.8	=	MG/KG	0.33	1.3	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-50-8	Copper	15.3	=	MG/KG	0.29	2	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-62-2	Vanadium	62.3	=	MG/KG	0.25	2.6	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-66-6	Zinc	21.9	=	MG/KG	0.25	2.6	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7440-70-2	Calcium	163000	=	MG/KG	29.8	331	6010B	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	7782-49-2	Selenium	1	J	MG/KG	0.66	2	6020	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	78-11-5	PETN	0.061	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	PH	pH	10.8	=	PH	0.13	0.13	9045C	TRUE
VEECA-5SD15	VEECA-5SD15-000H-0211	0	0.5	10-Feb-11	SD	TOC	Total organic carbon (TOC)	14100	=	MG/KG	330	1230	LLOYD_KAHN	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	118-96-7	2,4,6-Trinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	121-14-2	2,4-Dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	121-82-4	RDX	0.05	U	UG/L	0.036	0.25	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	14797-73-0	Perchlorate	0.25	U	UG/L	0.082	0.5	6850	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	18540-29-9	Chromium (hexavalent)	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	18540-29-9_D	Chromium (hexavalent), Dissolve	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	19406-51-0	4-Amino-2,6-dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	2691-41-0	HMX	0.05	U	UG/L	0.036	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	35572-78-2	2-Amino-4,6-dinitrotoluene	0.099	U	UG/L	0.099	0.3	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	479-45-8	Tetryl	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	55-63-0	Nitroglycerin	0.5	U	UG/L	0.33	0.99	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	606-20-2	2,6-Dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	618-87-1	3,5-Dinitroaniline	0.05	U	UG/L	0.025	0.5	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7429-90-5	Aluminum	2740	J	UG/L	480	2000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7429-90-5_D	Aluminum, Dissolved	1000	U	UG/L	480	2000	6010B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-89-6	Iron	2060	=	UG/L	25	100	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-89-6_D	Iron, Dissolved	85.9	J	UG/L	25	100	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-92-1	Lead	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-92-1_D	Lead, Dissolved	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-95-4	Magnesium	708000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-95-4_D	Magnesium, Dissolved	661000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-96-5	Manganese	73	J	UG/L	25	100	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7439-96-5_D	Manganese, Dissolved	50	U	UG/L	25	100	6010B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-02-0	Nickel	2	U	UG/L	1	3	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-02-0_D	Nickel, Dissolved	2.3	J	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-09-7	Potassium	193000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-09-7_D	Potassium, Dissolved	180000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-22-4	Silver	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-22-4_D	Silver, Dissolved	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-23-5	Sodium	5710000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-23-5_D	Sodium, Dissolved	5270000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-28-0	Thallium	0.54	J	UG/L	0.5	1.5	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-28-0_D	Thallium, Dissolved	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-36-0	Antimony	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-36-0_D	Antimony, Dissolved	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-38-2	Arsenic	2	J	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-38-2_D	Arsenic, Dissolved	2	U	UG/L	1	3	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-39-3	Barium	72.4	J	UG/L	25	200	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-39-3_D	Barium, Dissolved	63.9	J	UG/L	25	200	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-41-7	Beryllium	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-41-7_D	Beryllium, Dissolved	10	U	UG/L	3	30	6010B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-43-9	Cadmium	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-43-9_D	Cadmium, Dissolved	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-47-3	Chromium	4.8	J	UG/L	1.5	5	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-47-3_D	Chromium, Dissolved	4	U	UG/L	1.5	5	6020	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-48-4	Cobalt	3.1	=	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-48-4_D	Cobalt, Dissolved	1.9	J	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-50-8	Copper	12	=	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-50-8_D	Copper, Dissolved	10	=	UG/L	1	3	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-62-2	Vanadium	14	=	UG/L	3	12	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-62-2_D	Vanadium, Dissolved	4.1	J	UG/L	3	12	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-66-6	Zinc	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-66-6_D	Zinc, Dissolved	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-70-2	Calcium	622000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7440-70-2_D	Calcium, Dissolved	560000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7782-49-2	Selenium	17	=	UG/L	2	6	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	7782-49-2_D	Selenium, Dissolved	27	J	UG/L	10	30	6020	TRUE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	78-11-5	PETN	0.5	U	UG/L	0.3	0.99	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	88-72-2	2-Nitrotoluene	0.099	U	UG/L	0.087	0.99	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	98-95-3	Nitrobenzene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	99-08-1	3-Nitrotoluene	0.099	U	UG/L	0.056	0.5	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	99-35-4	1,3,5-Trinitrobenzene	0.05	U	UG/L	0.031	0.099	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	99-65-0	1,3-Dinitrobenzene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW01	VEECA-5SW01-0211	999	999	09-Feb-11	SW	99-99-0	4-Nitrotoluene	0.099	U	UG/L	0.087	0.99	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	118-96-7	2,4,6-Trinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	121-14-2	2,4-Dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	121-82-4	RDX	0.05	U	UG/L	0.036	0.25	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	14797-73-0	Perchlorate	0.25	U	UG/L	0.082	0.5	6850	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	18540-29-9	Chromium (hexavalent)	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	18540-29-9_D	Chromium (hexavalent), Dissolve	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	19406-51-0	4-Amino-2,6-dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	2691-41-0	HMX	0.05	U	UG/L	0.036	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	35572-78-2	2-Amino-4,6-dinitrotoluene	0.1	U	UG/L	0.1	0.3	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	479-45-8	Tetryl	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	55-63-0	Nitroglycerin	0.5	U	UG/L	0.33	1	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	606-20-2	2,6-Dinitrotoluene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	618-87-1	3,5-Dinitroaniline	0.05	U	UG/L	0.025	0.5	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7429-90-5	Aluminum	2040	J	UG/L	480	2000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7429-90-5_D	Aluminum, Dissolved	1000	U	UG/L	480	2000	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-89-6	Iron	1950	=	UG/L	25	100	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-89-6_D	Iron, Dissolved	72.3	J	UG/L	25	100	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-92-1	Lead	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-92-1_D	Lead, Dissolved	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-95-4	Magnesium	686000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-95-4_D	Magnesium, Dissolved	686000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-96-5	Manganese	57.1	J	UG/L	25	100	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7439-96-5_D	Manganese, Dissolved	50	U	UG/L	25	100	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-02-0	Nickel	3.6	=	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-02-0_D	Nickel, Dissolved	1.2	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-09-7	Potassium	186000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-09-7_D	Potassium, Dissolved	184000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-22-4	Silver	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-22-4_D	Silver, Dissolved	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-23-5	Sodium	5570000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-23-5_D	Sodium, Dissolved	5620000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-28-0	Thallium	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-28-0_D	Thallium, Dissolved	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-36-0	Antimony	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-36-0_D	Antimony, Dissolved	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-38-2	Arsenic	1.5	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-38-2_D	Arsenic, Dissolved	2	U	UG/L	1	3	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-39-3	Barium	67.6	J	UG/L	25	200	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-39-3_D	Barium, Dissolved	64.7	J	UG/L	25	200	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-41-7	Beryllium	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-41-7_D	Beryllium, Dissolved	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-43-9	Cadmium	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-43-9_D	Cadmium, Dissolved	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-47-3	Chromium	5.3	=	UG/L	1.5	5	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-47-3_D	Chromium, Dissolved	4	U	UG/L	1.5	5	6020	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-48-4	Cobalt	2.8	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-48-4_D	Cobalt, Dissolved	1.8	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-50-8	Copper	11.8	=	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-50-8_D	Copper, Dissolved	10.3	=	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-62-2	Vanadium	13.1	=	UG/L	3	12	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-62-2_D	Vanadium, Dissolved	5.5	J	UG/L	3	12	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-66-6	Zinc	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-66-6_D	Zinc, Dissolved	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-70-2	Calcium	597000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7440-70-2_D	Calcium, Dissolved	576000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7782-49-2	Selenium	2.9	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	7782-49-2_D	Selenium, Dissolved	26.2	J	UG/L	1	3	6020	TRUE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	78-11-5	PETN	0.5	U	UG/L	0.3	1	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	88-72-2	2-Nitrotoluene	0.1	U	UG/L	0.088	1	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	98-95-3	Nitrobenzene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	99-08-1	3-Nitrotoluene	0.1	U	UG/L	0.057	0.5	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	99-35-4	1,3,5-Trinitrobenzene	0.05	U	UG/L	0.031	0.1	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	99-65-0	1,3-Dinitrobenzene	0.05	U	UG/L	0.05	0.15	8330B	FALSE
VEECA-5SW02	VEECA-5SW02-0211	999	999	09-Feb-11	SW	99-99-0	4-Nitrotoluene	0.1	U	UG/L	0.088	1	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	118-96-7	2,4,6-Trinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	121-14-2	2,4-Dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	121-82-4	RDX	0.052	U	UG/L	0.037	0.26	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	14797-73-0	Perchlorate	0.25	U	UG/L	0.082	0.5	6850	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	18540-29-9	Chromium (hexavalent)	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	18540-29-9_D	Chromium (hexavalent), Dissolve	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	19406-51-0	4-Amino-2,6-dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	2691-41-0	HMX	0.052	U	UG/L	0.037	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	35572-78-2	2-Amino-4,6-dinitrotoluene	0.1	U	UG/L	0.1	0.31	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	479-45-8	Tetryl	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	55-63-0	Nitroglycerin	0.52	U	UG/L	0.34	1	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	606-20-2	2,6-Dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	618-87-1	3,5-Dinitroaniline	0.052	U	UG/L	0.026	0.52	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7429-90-5	Aluminum	2990	J	UG/L	480	2000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7429-90-5_D	Aluminum, Dissolved	1000	U	UG/L	480	2000	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-89-6	Iron	2530	=	UG/L	25	100	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-89-6_D	Iron, Dissolved	49.7	J	UG/L	25	100	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-92-1	Lead	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-92-1_D	Lead, Dissolved	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-95-4	Magnesium	699000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-95-4_D	Magnesium, Dissolved	652000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-96-5	Manganese	77.5	J	UG/L	25	100	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7439-96-5_D	Manganese, Dissolved	50	U	UG/L	25	100	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-02-0	Nickel	1.5	J	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-02-0_D	Nickel, Dissolved	1.5	J	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-09-7	Potassium	190000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-09-7_D	Potassium, Dissolved	177000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-22-4	Silver	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-22-4_D	Silver, Dissolved	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-23-5	Sodium	5650000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-23-5_D	Sodium, Dissolved	5230000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-28-0	Thallium	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-28-0_D	Thallium, Dissolved	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-36-0	Antimony	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-36-0_D	Antimony, Dissolved	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-38-2	Arsenic	1.7	J	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-38-2_D	Arsenic, Dissolved	2	U	UG/L	1	3	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-39-3	Barium	72.4	J	UG/L	25	200	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-39-3_D	Barium, Dissolved	62.4	J	UG/L	25	200	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-41-7	Beryllium	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-41-7_D	Beryllium, Dissolved	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-43-9	Cadmium	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-43-9_D	Cadmium, Dissolved	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-47-3	Chromium	7.5	=	UG/L	1.5	5	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-47-3_D	Chromium, Dissolved	4	U	UG/L	1.5	5	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-48-4	Cobalt	3	=	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-48-4_D	Cobalt, Dissolved	1.8	J	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-50-8	Copper	11.5	=	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-50-8_D	Copper, Dissolved	10.2	=	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-62-2	Vanadium	13.9	=	UG/L	3	12	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-62-2_D	Vanadium, Dissolved	4.3	J	UG/L	3	12	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-66-6	Zinc	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-66-6_D	Zinc, Dissolved	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-70-2	Calcium	612000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7440-70-2_D	Calcium, Dissolved	551000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7782-49-2	Selenium	2.5	U	UG/L	1	3	6020	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	7782-49-2_D	Selenium, Dissolved	12.8	=	UG/L	1	3	6020	TRUE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	78-11-5	PETN	0.52	U	UG/L	0.31	1	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	88-72-2	2-Nitrotoluene	0.1	U	UG/L	0.092	1	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	98-95-3	Nitrobenzene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	99-08-1	3-Nitrotoluene	0.1	U	UG/L	0.059	0.52	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	99-35-4	1,3,5-Trinitrobenzene	0.052	U	UG/L	0.032	0.1	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	99-65-0	1,3-Dinitrobenzene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW03	VEECA-5SW03-0211	999	999	09-Feb-11	SW	99-99-0	4-Nitrotoluene	0.1	U	UG/L	0.092	1	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	118-96-7	2,4,6-Trinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	121-14-2	2,4-Dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	121-82-4	RDX	0.052	U	UG/L	0.037	0.26	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	14797-73-0	Perchlorate	0.25	U	UG/L	0.082	0.5	6850	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	18540-29-9	Chromium (hexavalent)	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	18540-29-9_D	Chromium (hexavalent), Dissolve	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	19406-51-0	4-Amino-2,6-dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	2691-41-0	HMX	0.052	U	UG/L	0.037	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	35572-78-2	2-Amino-4,6-dinitrotoluene	0.1	U	UG/L	0.1	0.31	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	479-45-8	Tetryl	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	55-63-0	Nitroglycerin	0.52	U	UG/L	0.34	1	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	606-20-2	2,6-Dinitrotoluene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	618-87-1	3,5-Dinitroaniline	0.052	U	UG/L	0.026	0.52	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7429-90-5	Aluminum	2010	J	UG/L	480	2000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7429-90-5_D	Aluminum, Dissolved	1000	U	UG/L	480	2000	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-89-6	Iron	1910	=	UG/L	25	100	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-89-6_D	Iron, Dissolved	40.9	J	UG/L	25	100	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-92-1	Lead	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-92-1_D	Lead, Dissolved	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-95-4	Magnesium	698000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-95-4_D	Magnesium, Dissolved	661000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-96-5	Manganese	59	J	UG/L	25	100	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7439-96-5_D	Manganese, Dissolved	50	U	UG/L	25	100	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-09-7	Potassium	186000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-09-7_D	Potassium, Dissolved	179000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-22-4	Silver	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-22-4_D	Silver, Dissolved	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-23-5	Sodium	5740000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-23-5_D	Sodium, Dissolved	5300000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-28-0	Thallium	0.7	J	UG/L	0.5	1.5	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-28-0_D	Thallium, Dissolved	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-36-0	Antimony	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-36-0_D	Antimony, Dissolved	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-38-2	Arsenic	1.4	J	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-38-2_D	Arsenic, Dissolved	1.1	J	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-39-3	Barium	68.8	J	UG/L	25	200	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-39-3_D	Barium, Dissolved	64	J	UG/L	25	200	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-41-7	Beryllium	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-41-7_D	Beryllium, Dissolved	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-43-9	Cadmium	0.5	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-43-9_D	Cadmium, Dissolved	10	U	UG/L	10	30	6020	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-47-3	Chromium	4.2	J	UG/L	1.5	5	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-47-3_D	Chromium, Dissolved	4	U	UG/L	1.5	5	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-48-4	Cobalt	3	=	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-48-4_D	Cobalt, Dissolved	2	J	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-50-8	Copper	12.1	=	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-50-8_D	Copper, Dissolved	10.5	=	UG/L	1	3	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-62-2	Vanadium	11.3	J	UG/L	3	12	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-62-2_D	Vanadium, Dissolved	3.4	J	UG/L	3	12	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-66-6	Zinc	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-66-6_D	Zinc, Dissolved	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-70-2	Calcium	604000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7440-70-2_D	Calcium, Dissolved	560000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7782-49-2	Selenium	5	U	UG/L	2	6	6020	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	7782-49-2_D	Selenium, Dissolved	19.2	J	UG/L	10	30	6020	TRUE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	78-11-5	PETN	0.52	U	UG/L	0.31	1	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	88-72-2	2-Nitrotoluene	0.1	U	UG/L	0.092	1	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	98-95-3	Nitrobenzene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	99-08-1	3-Nitrotoluene	0.1	U	UG/L	0.059	0.52	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	99-35-4	1,3,5-Trinitrobenzene	0.052	U	UG/L	0.032	0.1	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	99-65-0	1,3-Dinitrobenzene	0.052	U	UG/L	0.052	0.16	8330B	FALSE
VEECA-5SW04	VEECA-5SW04-0211	999	999	09-Feb-11	SW	99-99-0	4-Nitrotoluene	0.1	U	UG/L	0.092	1	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	118-96-7	2,4,6-Trinitrotoluene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	121-14-2	2,4-Dinitrotoluene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	121-82-4	RDX	0.051	U	UG/L	0.037	0.26	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	14797-73-0	Perchlorate	0.25	U	UG/L	0.082	0.5	6850	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	18540-29-9	Chromium (hexavalent)	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	18540-29-9_D	Chromium (hexavalent), Dissolve	5	UJ	UG/L	2	10	7196A	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	19406-51-0	4-Amino-2,6-dinitrotoluene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	2691-41-0	HMX	0.051	U	UG/L	0.037	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	35572-78-2	2-Amino-4,6-dinitrotoluene	0.1	U	UG/L	0.1	0.31	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	479-45-8	Tetryl	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	55-63-0	Nitroglycerin	0.51	U	UG/L	0.34	1	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	606-20-2	2,6-Dinitrotoluene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	618-87-1	3,5-Dinitroaniline	0.051	U	UG/L	0.026	0.51	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7429-90-5	Aluminum	2700	J	UG/L	480	2000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7429-90-5_D	Aluminum, Dissolved	1000	U	UG/L	480	2000	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-89-6	Iron	2140	=	UG/L	25	100	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-89-6_D	Iron, Dissolved	252	=	UG/L	25	100	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-92-1	Lead	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-92-1_D	Lead, Dissolved	1	U	UG/L	0.6	2.5	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-95-4	Magnesium	699000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-95-4_D	Magnesium, Dissolved	677000	=	UG/L	400	5000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-96-5	Manganese	71.2	J	UG/L	25	100	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7439-96-5_D	Manganese, Dissolved	50	U	UG/L	25	100	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-02-0	Nickel	2.2	J	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-02-0_D	Nickel, Dissolved	3.9	=	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-09-7	Potassium	189000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-09-7_D	Potassium, Dissolved	187000	=	UG/L	930	10000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-22-4	Silver	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-22-4_D	Silver, Dissolved	0.5	U	UG/L	0.3	1	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-23-5	Sodium	5590000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-23-5_D	Sodium, Dissolved	5490000	J	UG/L	2500	10000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-28-0	Thallium	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-28-0_D	Thallium, Dissolved	1	U	UG/L	0.5	1.5	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-36-0	Antimony	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-36-0_D	Antimony, Dissolved	4	U	UG/L	2	6	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-38-2	Arsenic	1.9	J	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-38-2_D	Arsenic, Dissolved	2	U	UG/L	1	3	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-39-3	Barium	71.1	J	UG/L	25	200	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-39-3_D	Barium, Dissolved	67.7	J	UG/L	25	200	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-41-7	Beryllium	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-41-7_D	Beryllium, Dissolved	10	U	UG/L	3	30	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-43-9	Cadmium	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-43-9_D	Cadmium, Dissolved	10	U	UG/L	10	30	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-47-3	Chromium	6.2	=	UG/L	1.5	5	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-47-3_D	Chromium, Dissolved	4	U	UG/L	1.5	5	6020	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-48-4	Cobalt	2.9	J	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-48-4_D	Cobalt, Dissolved	1.9	J	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-50-8	Copper	11.2	=	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-50-8_D	Copper, Dissolved	9.9	=	UG/L	1	3	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-62-2	Vanadium	13.2	=	UG/L	3	12	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-62-2_D	Vanadium, Dissolved	5.3	J	UG/L	3	12	6020	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-66-6	Zinc	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-66-6_D	Zinc, Dissolved	100	U	UG/L	30	200	6010B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-70-2	Calcium	606000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	7440-70-2_D	Calcium, Dissolved	581000	=	UG/L	500	5000	6010B	TRUE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	78-11-5	PETN	0.51	U	UG/L	0.31	1	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	88-72-2	2-Nitrotoluene	0.1	U	UG/L	0.09	1	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	98-95-3	Nitrobenzene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	99-08-1	3-Nitrotoluene	0.1	U	UG/L	0.058	0.51	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	99-35-4	1,3,5-Trinitrobenzene	0.051	U	UG/L	0.032	0.1	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	99-65-0	1,3-Dinitrobenzene	0.051	U	UG/L	0.051	0.15	8330B	FALSE
VEECA-5SW05	VEECA-5SW05-0211	999	999	09-Feb-11	SW	99-99-0	4-Nitrotoluene	0.1	U	UG/L	0.09	1	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	14797-73-0	Perchlorate	0.00058	U	MG/KG	0.00027	0.0052	6850	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.007	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7429-90-5	Aluminum	6560	=	MG/KG	28	100	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7439-89-6	Iron	7650	=	MG/KG	5.5	50	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7439-95-4	Magnesium	6940	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7439-96-5	Manganese	219	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-02-0	Nickel	4	J	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-09-7	Potassium	1560	=	MG/KG	50	500	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-23-5	Sodium	1970	=	MG/KG	55	500	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-38-2	Arsenic	6.8	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-39-3	Barium	14.7	=	MG/KG	0.6	10	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-43-9	Cadmium	0.15	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-47-3	Chromium	14.5	=	MG/KG	0.7	5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-48-4	Cobalt	2	J	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-50-8	Copper	8.8	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-62-2	Vanadium	16.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-66-6	Zinc	14.8	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7440-70-2	Calcium	170000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	7782-49-2	Selenium	1.2	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-2DU01	VEECA-2SMI01-0211	0	0.17	04-Feb-11	SMI	PH	pH	7.7	=	PH	0.1	0.1	9045C	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.005	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.0004	J	MG/KG	0.00026	0.005	6850	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.057	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0069	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	1030	=	MG/KG	28	100	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	1440	=	MG/KG	5.5	50	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	2.5	UJ	MG/KG	1.3	5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	10000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	46.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	293	J	MG/KG	50	500	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	2150	J	MG/KG	55	500	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	3	U	MG/KG	1.5	5	6020	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	7.9	J	MG/KG	0.6	10	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	6.2	=	MG/KG	0.7	5	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	2.5	U	MG/KG	1.2	5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	2.5	UJ	MG/KG	1.1	7.5	6010B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	4	J	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	2.5	J	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	285000	=	MG/KG	45	500	6010B	TRUE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.057	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-2DU02	VEECA-2SMI02-0211	0	0.17	14-Feb-11	SMI	PH	pH	7.8	=	PH	0.1	0.1	9045C	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00085	U	MG/KG	0.00027	0.0052	6850	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	23200	=	MG/KG	28	100	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	26700	=	MG/KG	5.5	50	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	1.7	J	MG/KG	1.3	5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	7730	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	651	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	14.9	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	4990	=	MG/KG	50	500	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	947	J	MG/KG	55	500	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	9.3	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	49.3	=	MG/KG	0.6	10	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.25	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.28	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	49.7	J	MG/KG	0.7	5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	11	=	MG/KG	1.2	5	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	22.1	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	66.7	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	37.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	73500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	0.74	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-2DU03	VEECA-2SMI03-0211	0	0.17	07-Feb-11	SMI	PH	pH	7.8	=	PH	0.1	0.1	9045C	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00098	U	MG/KG	0.00024	0.0047	6850	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	16300	=	MG/KG	28	100	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	19100	=	MG/KG	5.5	50	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	9.8	=	MG/KG	1.3	5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	7340	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	556	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	9.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	3380	=	MG/KG	50	500	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	802	J	MG/KG	55	500	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	5.9	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	26.1	=	MG/KG	0.6	10	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.16	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.25	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	29.1	J	MG/KG	0.7	5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	21.6	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	42.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	63.8	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	130000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	0.86	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-2DU04	VEECA-2SMI04-0211	0	0.17	07-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.005	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00075	U	MG/KG	0.00024	0.0047	6850	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.057	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0069	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	16800	=	MG/KG	28	100	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	19000	=	MG/KG	5.5	50	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	8800	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	396	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	9.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	3730	=	MG/KG	50	500	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	800	J	MG/KG	55	500	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	8	=	MG/KG	1.5	5	6020	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	23.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.15	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	27.8	J	MG/KG	0.7	5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	5.6	=	MG/KG	1.2	5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	20.8	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	39.3	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	31.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	134000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	1.1	J	MG/KG	1	3	6020	TRUE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.057	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0095	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-2DU05	VEECA-2SMI05-0211	0	0.17	07-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	%MOIST	% Moisture	13.6	=	PCT	0.1	0.1	D2216	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	14797-73-0	Perchlorate	0.00033	J	MG/KG	0.0003	0.0057	6850	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.14	U	MG/KG	0.058	0.29	7196A	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	479-45-8	Tetryl	0.04	J	MG/KG	0.0098	0.24	8330B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7429-90-5	Aluminum	15400	=	MG/KG	6.5	23.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7439-89-6	Iron	17300	=	MG/KG	1.3	11.6	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7439-92-1	Lead	1.3	=	MG/KG	0.3	1.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7439-95-4	Magnesium	6880	J	MG/KG	5.2	57.9	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7439-96-5	Manganese	479	=	MG/KG	0.29	1.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-02-0	Nickel	10.1	=	MG/KG	0.28	1.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-09-7	Potassium	3760	=	MG/KG	11.6	116	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-22-4	Silver	0.23	UJ	MG/KG	0.1	0.58	6010B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-23-5	Sodium	381	J	MG/KG	12.7	116	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-28-0	Thallium	0.1	J	MG/KG	0.058	0.17	6020	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-36-0	Antimony	2.3	U	MG/KG	1.1	3.5	6010B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-38-2	Arsenic	21.7	=	MG/KG	0.17	0.58	6020	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-39-3	Barium	28.5	=	MG/KG	0.14	2.3	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-41-7	Beryllium	0.2	J	MG/KG	0.035	0.35	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-43-9	Cadmium	0.06	J	MG/KG	0.035	0.35	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-47-3	Chromium	29	=	MG/KG	0.16	1.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-48-4	Cobalt	5.9	=	MG/KG	0.29	1.2	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-50-8	Copper	19.3	=	MG/KG	0.25	1.7	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-62-2	Vanadium	34.9	=	MG/KG	0.22	2.3	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-66-6	Zinc	25	J	MG/KG	0.22	2.3	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7440-70-2	Calcium	169000	=	MG/KG	52.1	579	6010B	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	7782-49-2	Selenium	1.1	=	MG/KG	0.12	0.35	6020	TRUE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-2SB03	VEECA-2SB03-0001-0211	0	1	09-Feb-11	SB	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	%MOIST	% Moisture	10.9	=	PCT	0.1	0.1	D2216	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	14797-73-0	Perchlorate	0.00031	J	MG/KG	0.00028	0.0054	6850	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.028	U	MG/KG	0.011	0.056	7196A	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7429-90-5	Aluminum	9210	=	MG/KG	6.3	22.4	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7439-89-6	Iron	9290	=	MG/KG	1.2	11.2	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7439-92-1	Lead	0.56	U	MG/KG	0.29	1.1	6010B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7439-95-4	Magnesium	8550	J	MG/KG	5.1	56.1	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7439-96-5	Manganese	211	=	MG/KG	0.28	1.1	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-02-0	Nickel	4.7	=	MG/KG	0.27	1.1	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-09-7	Potassium	1970	=	MG/KG	11.2	112	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-22-4	Silver	0.22	UJ	MG/KG	0.1	0.56	6010B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-23-5	Sodium	1300	=	MG/KG	12.3	112	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-28-0	Thallium	0.056	J	MG/KG	0.056	0.17	6020	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-36-0	Antimony	2.2	U	MG/KG	1.1	3.4	6010B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-38-2	Arsenic	3.9	=	MG/KG	0.17	0.56	6020	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-39-3	Barium	16	=	MG/KG	0.13	2.2	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-41-7	Beryllium	0.11	UJ	MG/KG	0.034	0.34	6010B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-43-9	Cadmium	0.11	U	MG/KG	0.034	0.34	6010B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-47-3	Chromium	17.8	=	MG/KG	0.16	1.1	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-48-4	Cobalt	3	=	MG/KG	0.28	1.1	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-50-8	Copper	11.9	=	MG/KG	0.25	1.7	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-62-2	Vanadium	19.8	=	MG/KG	0.21	2.2	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-66-6	Zinc	15.2	J	MG/KG	0.21	2.2	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7440-70-2	Calcium	255000	=	MG/KG	50.5	561	6010B	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	7782-49-2	Selenium	0.63	=	MG/KG	0.11	0.34	6020	TRUE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-2SB13	VEECA-2SB13-000H-0211	0	0.5	10-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	%MOIST	% Moisture	21.6	=	PCT	0.1	0.1	D2216	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	14797-73-0	Perchlorate	0.0005	U	MG/KG	0.00033	0.0063	6850	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	18540-29-9	Chromium (hexavalent)	0.032	U	MG/KG	0.013	0.064	7196A	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7429-90-5	Aluminum	7700	=	MG/KG	7.1	25.5	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7439-89-6	Iron	11800	=	MG/KG	1.4	12.7	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7439-92-1	Lead	3.2	U	MG/KG	1.7	6.4	6010B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7439-95-4	Magnesium	5430	=	MG/KG	5.7	63.7	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7439-96-5	Manganese	646	=	MG/KG	0.32	1.3	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-02-0	Nickel	6	=	MG/KG	0.31	1.3	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-09-7	Potassium	2000	=	MG/KG	12.7	127	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-22-4	Silver	0.12	J	MG/KG	0.11	0.64	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-23-5	Sodium	3870	J	MG/KG	14	127	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-28-0	Thallium	0.64	U	MG/KG	0.32	0.96	6020	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-36-0	Antimony	2.5	UJ	MG/KG	1.2	3.8	6010B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-38-2	Arsenic	5.9	=	MG/KG	0.96	3.2	6020	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-39-3	Barium	15.5	=	MG/KG	0.15	2.5	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-41-7	Beryllium	0.13	U	MG/KG	0.038	0.38	6010B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-43-9	Cadmium	0.1	J	MG/KG	0.038	0.38	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-47-3	Chromium	22.5	=	MG/KG	0.18	1.3	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-48-4	Cobalt	5.9	=	MG/KG	0.32	1.3	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-50-8	Copper	12.1	=	MG/KG	0.28	1.9	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-62-2	Vanadium	53.9	J	MG/KG	0.24	2.5	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-66-6	Zinc	18	=	MG/KG	0.24	2.5	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7440-70-2	Calcium	282000	=	MG/KG	28.7	319	6010B	TRUE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	7782-49-2	Selenium	1.3	U	MG/KG	0.64	1.9	6020	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.017	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.015	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4SB01	VEECA-4SB01-001H-0211	0	1.5	18-Feb-11	SB	PH	pH	10.3	=	PH	0.13	0.13	9045C	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.0049	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	14797-73-0	Perchlorate	0.00067	U	MG/KG	0.00025	0.0049	6850	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0092	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0092	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	55-63-0	Nitroglycerin	0.055	U	MG/KG	0.014	0.46	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0067	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0081	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7429-90-5	Aluminum	19000	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7439-89-6	Iron	20800	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7439-92-1	Lead	5	=	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7439-95-4	Magnesium	7000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7439-96-5	Manganese	473	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-02-0	Nickel	11	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-09-7	Potassium	4730	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-23-5	Sodium	537	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-38-2	Arsenic	17.1	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-39-3	Barium	33.7	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-41-7	Beryllium	0.37	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-43-9	Cadmium	0.26	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-47-3	Chromium	32.1	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-48-4	Cobalt	5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-50-8	Copper	19.3	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-62-2	Vanadium	33.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-66-6	Zinc	35	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7440-70-2	Calcium	70000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	7782-49-2	Selenium	0.91	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	78-11-5	PETN	0.055	U	MG/KG	0.023	0.46	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0092	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.0039	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.23	8330B	FALSE
VEECA-4DU01	VEECA-4SMI01-0211	0	0.17	02-Feb-11	SMI	PH	pH	7.6	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	14797-73-0	Perchlorate	0.00038	U	MG/KG	0.00025	0.0048	6850	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.007	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7429-90-5	Aluminum	16200	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7439-89-6	Iron	21700	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7439-92-1	Lead	2.2	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7439-95-4	Magnesium	16500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7439-96-5	Manganese	561	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-02-0	Nickel	11.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-09-7	Potassium	2920	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-23-5	Sodium	814	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-38-2	Arsenic	36.1	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-39-3	Barium	21	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-41-7	Beryllium	0.2	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-47-3	Chromium	39.9	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-48-4	Cobalt	4.5	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-50-8	Copper	22.2	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-62-2	Vanadium	51.3	=	MG/KG	0.95	10	6010B	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-66-6	Zinc	32.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7440-70-2	Calcium	129000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	7782-49-2	Selenium	0.71	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-4DU02	VEECA-4SMI02-0211	0	0.17	02-Feb-11	SMI	PH	pH	8.1	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.0017	U	MG/KG	0.00024	0.0046	6850	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0088	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	18700	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	23800	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	6900	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	832	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	12.8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	3270	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	384	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	6.1	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	38.8	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.21	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.28	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	47.7	J	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	11.4	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	21.6	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	66.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	33.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	78300	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	1.1	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	98-95-3	Nitrobenzene	0.098	NJ	MG/KG	0.018	0.25	8330B	TRUE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU03	VEECA-4SMI03-0211	0	0.17	07-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.02	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0054	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	14797-73-0	Perchlorate	0.0016	J	MG/KG	0.00027	0.0052	6850	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0074	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0089	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7429-90-5	Aluminum	14500	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7439-89-6	Iron	18800	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7439-95-4	Magnesium	6350	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7439-96-5	Manganese	670	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-02-0	Nickel	9.8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-09-7	Potassium	2490	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-23-5	Sodium	2490	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-38-2	Arsenic	5.4	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-39-3	Barium	22.3	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-41-7	Beryllium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-43-9	Cadmium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-47-3	Chromium	34.6	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-48-4	Cobalt	7.6	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-50-8	Copper	17.8	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-62-2	Vanadium	59.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-66-6	Zinc	28.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7440-70-2	Calcium	149000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	7782-49-2	Selenium	0.54	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU04	VEECA-4SMI04-0211	0	0.17	15-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0052	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	14797-73-0	Perchlorate	0.00088	U	MG/KG	0.00024	0.0046	6850	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.12	U	MG/KG	0.05	0.25	7196A	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	2691-41-0	HMX	0.027	NJ	MG/KG	0.012	0.24	8330B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0098	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.49	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0072	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0086	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7429-90-5	Aluminum	21100	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7439-89-6	Iron	27200	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7439-92-1	Lead	1.7	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7439-95-4	Magnesium	7580	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7439-96-5	Manganese	737	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-02-0	Nickel	13.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-09-7	Potassium	3580	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-23-5	Sodium	273	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-38-2	Arsenic	8	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-39-3	Barium	33.9	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-41-7	Beryllium	0.26	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-43-9	Cadmium	0.23	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-47-3	Chromium	37.1	J	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-48-4	Cobalt	12.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-50-8	Copper	24.8	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-62-2	Vanadium	71.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-66-6	Zinc	39.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7440-70-2	Calcium	64900	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	7782-49-2	Selenium	1.6	=	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	78-11-5	PETN	0.059	U	MG/KG	0.024	0.49	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.012	NJ	MG/KG	0.0098	0.24	8330B	TRUE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-4DU05	VEECA-4SMI05-0211	0	0.17	07-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.02	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0054	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	14797-73-0	Perchlorate	0.0013	J	MG/KG	0.00024	0.0046	6850	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0074	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0089	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7429-90-5	Aluminum	19200	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7439-89-6	Iron	22700	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7439-92-1	Lead	1.3	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7439-95-4	Magnesium	5830	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7439-96-5	Manganese	683	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-02-0	Nickel	12	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-09-7	Potassium	2890	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-23-5	Sodium	225	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-38-2	Arsenic	13.4	=	MG/KG	1.5	5	6020	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-39-3	Barium	33.6	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-41-7	Beryllium	0.22	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-43-9	Cadmium	0.15	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-47-3	Chromium	36.3	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-48-4	Cobalt	7.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-50-8	Copper	21.4	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-62-2	Vanadium	69.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-66-6	Zinc	34.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7440-70-2	Calcium	142000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	7782-49-2	Selenium	1.7	J	MG/KG	1	3	6020	TRUE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	98-95-3	Nitrobenzene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	99-08-1	3-Nitrotoluene	0.03	U	MG/KG	0.016	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU06	VEECA-4SMI06-0211	0	0.17	15-Feb-11	SMI	PH	pH	8.1	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.026	NJ	MG/KG	0.02	0.26	8330B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.031	U	MG/KG	0.0054	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	121-82-4	RDX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	14797-73-0	Perchlorate	0.0012	J	MG/KG	0.00026	0.005	6850	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	2691-41-0	HMX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	479-45-8	Tetryl	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.51	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.031	U	MG/KG	0.0074	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.031	U	MG/KG	0.009	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7429-90-5	Aluminum	20400	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7439-89-6	Iron	22800	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7439-95-4	Magnesium	7140	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7439-96-5	Manganese	584	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-02-0	Nickel	12.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-09-7	Potassium	4180	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-23-5	Sodium	415	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-38-2	Arsenic	8.3	=	MG/KG	1.5	5	6020	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-39-3	Barium	29.9	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-41-7	Beryllium	0.24	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-43-9	Cadmium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-47-3	Chromium	36.9	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-48-4	Cobalt	7.8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-50-8	Copper	22.1	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-62-2	Vanadium	48.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-66-6	Zinc	36.9	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7440-70-2	Calcium	120000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	7782-49-2	Selenium	1.8	J	MG/KG	1	3	6020	TRUE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.026	0.51	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	98-95-3	Nitrobenzene	0.031	U	MG/KG	0.018	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	99-08-1	3-Nitrotoluene	0.031	U	MG/KG	0.016	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.031	U	MG/KG	0.0043	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.031	U	MG/KG	0.019	0.26	8330B	FALSE
VEECA-4DU07	VEECA-4SMI07-0211	0	0.17	15-Feb-11	SMI	PH	pH	8.1	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	14797-73-0	Perchlorate	0.0015	J	MG/KG	0.00024	0.0046	6850	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7429-90-5	Aluminum	22100	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7439-89-6	Iron	23500	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7439-92-1	Lead	1.5	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7439-95-4	Magnesium	6530	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7439-96-5	Manganese	528	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-02-0	Nickel	11.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-09-7	Potassium	4460	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-23-5	Sodium	252	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-38-2	Arsenic	8.8	=	MG/KG	1.5	5	6020	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-39-3	Barium	26.7	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-41-7	Beryllium	0.27	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-43-9	Cadmium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-47-3	Chromium	37.2	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-48-4	Cobalt	7.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-50-8	Copper	19.4	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-62-2	Vanadium	48.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-66-6	Zinc	33.8	J	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7440-70-2	Calcium	105000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	7782-49-2	Selenium	2	U	MG/KG	1	3	6020	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU08	VEECA-4SMI08-0211	0	0.17	14-Feb-11	SMI	PH	pH	8.2	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	14797-73-0	Perchlorate	0.0011	J	MG/KG	0.00024	0.0047	6850	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.015	0.48	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.0071	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0085	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7429-90-5	Aluminum	25900	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7439-89-6	Iron	26600	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7439-92-1	Lead	2	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7439-95-4	Magnesium	7860	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7439-96-5	Manganese	543	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-02-0	Nickel	13.1	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-09-7	Potassium	5470	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-23-5	Sodium	306	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-38-2	Arsenic	11.4	=	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-39-3	Barium	27.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-41-7	Beryllium	0.31	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-43-9	Cadmium	0.46	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-47-3	Chromium	41.9	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-48-4	Cobalt	7.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-50-8	Copper	23.1	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-62-2	Vanadium	49.2	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-66-6	Zinc	42.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7440-70-2	Calcium	102000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	7782-49-2	Selenium	1.7	J	MG/KG	0.5	1.5	6020	TRUE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.013	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	98-95-3	Nitrobenzene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	99-08-1	3-Nitrotoluene	0.029	U	MG/KG	0.015	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0097	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.0041	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-4DU09	VEECA-4SMI09-0211	0	0.17	15-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.031	U	MG/KG	0.02	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.031	U	MG/KG	0.0054	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	121-82-4	RDX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	14797-73-0	Perchlorate	0.00081	J	MG/KG	0.00026	0.005	6850	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	2691-41-0	HMX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	479-45-8	Tetryl	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.51	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.031	U	MG/KG	0.0074	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.031	U	MG/KG	0.009	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7429-90-5	Aluminum	16000	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7439-89-6	Iron	19000	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7439-92-1	Lead	2.5	U	MG/KG	1.3	5	6010B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7439-95-4	Magnesium	6500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7439-96-5	Manganese	321	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-02-0	Nickel	8.8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-09-7	Potassium	2660	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-23-5	Sodium	297	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-28-0	Thallium	1	U	MG/KG	0.5	1.5	6020	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-38-2	Arsenic	13.3	=	MG/KG	1.5	5	6020	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-39-3	Barium	18.1	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-41-7	Beryllium	0.18	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-43-9	Cadmium	0.2	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-47-3	Chromium	30.6	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-48-4	Cobalt	4.1	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-50-8	Copper	17.8	=	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-62-2	Vanadium	39.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-66-6	Zinc	28.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7440-70-2	Calcium	154000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	7782-49-2	Selenium	1.9	J	MG/KG	1	3	6020	TRUE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.026	0.51	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	98-95-3	Nitrobenzene	0.031	U	MG/KG	0.018	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	99-08-1	3-Nitrotoluene	0.031	U	MG/KG	0.016	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.031	U	MG/KG	0.0043	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.031	U	MG/KG	0.019	0.26	8330B	FALSE
VEECA-4DU10	VEECA-4SMI10-0211	0	0.17	15-Feb-11	SMI	PH	pH	8.1	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0052	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	14797-73-0	Perchlorate	0.00047	U	MG/KG	0.00024	0.0046	6850	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	55-63-0	Nitroglycerin	0.059	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0072	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.03	U	MG/KG	0.0087	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7429-90-5	Aluminum	16500	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7439-89-6	Iron	21300	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7439-92-1	Lead	1.8	J	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7439-95-4	Magnesium	5800	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7439-96-5	Manganese	389	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-02-0	Nickel	9.1	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-09-7	Potassium	2540	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-23-5	Sodium	272	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-38-2	Arsenic	14.6	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-39-3	Barium	22.5	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-41-7	Beryllium	0.2	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-47-3	Chromium	31.3	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-48-4	Cobalt	5.1	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-50-8	Copper	20.9	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-62-2	Vanadium	48.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-66-6	Zinc	30.9	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7440-70-2	Calcium	155000	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	7782-49-2	Selenium	1.2	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	78-11-5	PETN	0.059	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.0099	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU11	VEECA-4SMI11-0211	0	0.17	03-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.028	U	MG/KG	0.018	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.028	U	MG/KG	0.005	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	121-82-4	RDX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	14797-73-0	Perchlorate	0.00043	U	MG/KG	0.00027	0.0051	6850	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	2691-41-0	HMX	0.028	U	MG/KG	0.011	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	479-45-8	Tetryl	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	55-63-0	Nitroglycerin	0.056	U	MG/KG	0.014	0.47	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.028	U	MG/KG	0.0069	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.028	U	MG/KG	0.0083	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7429-90-5	Aluminum	24400	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7439-89-6	Iron	24500	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7439-92-1	Lead	5.6	=	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7439-95-4	Magnesium	11500	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7439-96-5	Manganese	540	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-02-0	Nickel	12.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-09-7	Potassium	3820	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-23-5	Sodium	287	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-38-2	Arsenic	13.9	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-39-3	Barium	36.1	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-41-7	Beryllium	0.47	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-47-3	Chromium	44.6	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-48-4	Cobalt	5.3	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-50-8	Copper	20.2	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-62-2	Vanadium	46.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-66-6	Zinc	36.5	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7440-70-2	Calcium	77200	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	7782-49-2	Selenium	0.79	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	78-11-5	PETN	0.056	U	MG/KG	0.024	0.47	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.028	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.028	U	MG/KG	0.0094	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.028	U	MG/KG	0.0039	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.028	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-4DU12	VEECA-4SMI12-0211	0	0.17	04-Feb-11	SMI	PH	pH	7.9	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.029	U	MG/KG	0.019	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.029	U	MG/KG	0.0051	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	121-82-4	RDX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	14797-73-0	Perchlorate	0.00039	U	MG/KG	0.00025	0.0048	6850	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	2691-41-0	HMX	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	479-45-8	Tetryl	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	55-63-0	Nitroglycerin	0.058	U	MG/KG	0.014	0.48	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.029	U	MG/KG	0.007	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.029	U	MG/KG	0.0084	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7429-90-5	Aluminum	24600	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7439-89-6	Iron	26300	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7439-92-1	Lead	6.7	=	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7439-95-4	Magnesium	8930	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7439-96-5	Manganese	509	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-02-0	Nickel	12.7	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-09-7	Potassium	4840	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-23-5	Sodium	396	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-38-2	Arsenic	12.6	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-39-3	Barium	43.3	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-41-7	Beryllium	0.53	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-47-3	Chromium	43	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-48-4	Cobalt	6.2	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-50-8	Copper	21.4	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-62-2	Vanadium	44.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-66-6	Zinc	32.4	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7440-70-2	Calcium	83400	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	7782-49-2	Selenium	0.64	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	78-11-5	PETN	0.058	U	MG/KG	0.024	0.48	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.029	U	MG/KG	0.012	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.029	U	MG/KG	0.0096	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.029	U	MG/KG	0.004	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.029	U	MG/KG	0.017	0.24	8330B	FALSE
VEECA-4DU13	VEECA-4SMI13-0211	0	0.17	03-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.031	U	MG/KG	0.02	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.031	U	MG/KG	0.0054	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	121-82-4	RDX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	14797-73-0	Perchlorate	0.00041	U	MG/KG	0.00027	0.0051	6850	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	2691-41-0	HMX	0.031	U	MG/KG	0.012	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	479-45-8	Tetryl	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	55-63-0	Nitroglycerin	0.061	U	MG/KG	0.015	0.51	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.031	U	MG/KG	0.0074	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.031	U	MG/KG	0.009	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7429-90-5	Aluminum	20200	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7439-89-6	Iron	20000	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7439-92-1	Lead	5.3	=	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7439-95-4	Magnesium	13200	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7439-96-5	Manganese	473	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-02-0	Nickel	11.8	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-09-7	Potassium	3180	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-23-5	Sodium	387	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE

Table 1 - Attachment K-3
Analytical Data Used in the HHRA
Eastern Conservation Area
Former VNTR, Vieques, Puerto Rico

Station ID	Sample ID	Upper Depth (ft)	Lower Depth (ft)	Collection Date	Matrix	CAS Number	Chemical	Result	Qualifier	Units	Detection Limit	Reporting Limit	Method	Detected
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-38-2	Arsenic	10.2	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-39-3	Barium	33.4	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-41-7	Beryllium	0.41	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-43-9	Cadmium	0.5	U	MG/KG	0.15	1.5	6010B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-47-3	Chromium	38.2	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-48-4	Cobalt	4.5	J	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-50-8	Copper	19.2	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-62-2	Vanadium	39	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-66-6	Zinc	31.1	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7440-70-2	Calcium	77400	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	7782-49-2	Selenium	0.81	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	78-11-5	PETN	0.061	U	MG/KG	0.026	0.51	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.031	U	MG/KG	0.013	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.031	U	MG/KG	0.01	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.031	U	MG/KG	0.0043	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.031	U	MG/KG	0.019	0.26	8330B	FALSE
VEECA-4DU14	VEECA-4SMI14-0211	0	0.17	03-Feb-11	SMI	PH	pH	7.6	=	PH	0.1	0.1	9045C	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	118-96-7	2,4,6-Trinitrotoluene	0.03	U	MG/KG	0.019	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	121-14-2	2,4-Dinitrotoluene	0.03	U	MG/KG	0.0053	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	121-82-4	RDX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	14797-73-0	Perchlorate	0.0004	U	MG/KG	0.00026	0.005	6850	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	18540-29-9	Chromium (hexavalent)	0.025	U	MG/KG	0.01	0.05	7196A	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	19406-51-0	4-Amino-2,6-dinitrotoluene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	2691-41-0	HMX	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	35572-78-2	2-Amino-4,6-dinitrotoluene	0.03	U	MG/KG	0.012	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	479-45-8	Tetryl	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	55-63-0	Nitroglycerin	0.06	U	MG/KG	0.015	0.5	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	606-20-2	2,6-Dinitrotoluene	0.03	U	MG/KG	0.0073	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	618-87-1	3,5-Dinitroaniline	0.013	J	MG/KG	0.0088	0.25	8330B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7429-90-5	Aluminum	33900	=	MG/KG	28	100	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7439-89-6	Iron	38000	=	MG/KG	5.5	50	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7439-92-1	Lead	15	=	MG/KG	1.3	5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7439-95-4	Magnesium	7140	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7439-96-5	Manganese	838	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-02-0	Nickel	17.1	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-09-7	Potassium	7170	=	MG/KG	50	500	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-22-4	Silver	1	U	MG/KG	0.45	2.5	6010B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-23-5	Sodium	658	J	MG/KG	55	500	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-28-0	Thallium	0.5	U	MG/KG	0.25	0.75	6020	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-36-0	Antimony	10	UJ	MG/KG	4.7	15	6010B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-38-2	Arsenic	27.5	J	MG/KG	0.75	2.5	6020	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-39-3	Barium	43.2	=	MG/KG	0.6	10	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-41-7	Beryllium	0.97	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-43-9	Cadmium	0.15	J	MG/KG	0.15	1.5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-47-3	Chromium	59.4	=	MG/KG	0.7	5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-48-4	Cobalt	10.5	=	MG/KG	1.2	5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-50-8	Copper	19.9	J	MG/KG	1.1	7.5	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-62-2	Vanadium	67.6	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-66-6	Zinc	41.9	=	MG/KG	0.95	10	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7440-70-2	Calcium	26300	=	MG/KG	22.5	250	6010B	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	7782-49-2	Selenium	0.5	J	MG/KG	0.5	1.5	6020	TRUE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	78-11-5	PETN	0.06	U	MG/KG	0.025	0.5	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	88-72-2	2-Nitrotoluene	0.03	U	MG/KG	0.013	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	99-35-4	1,3,5-Trinitrobenzene	0.03	U	MG/KG	0.01	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	99-65-0	1,3-Dinitrobenzene	0.03	U	MG/KG	0.0042	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	99-99-0	4-Nitrotoluene	0.03	U	MG/KG	0.018	0.25	8330B	FALSE
VEECA-4DU15	VEECA-4SMI15-0211	0	0.17	03-Feb-11	SMI	PH	pH	8	=	PH	0.1	0.1	9045C	TRUE

Attachment K-4
ProUCL Output

Attachment K-4

ProUCL Output

Merged Discrete and Incremental Samples

Attachment K-4

Site-wide Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	Macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	36	Number of Detected Data	29
Number of Distinct Detected Data	26	Number of Non-Detect Data	7
		Percent Non-Detects	19.44%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.7	Minimum Detected	0.531
Maximum Detected	36.1	Maximum Detected	3.586
Mean of Detected	11.2	Mean of Detected	2.188
SD of Detected	7.884	SD of Detected	0.715
Minimum Non-Detect	1.7	Minimum Non-Detect	0.531
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	27
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	25.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.867	Shapiro Wilk Test Statistic	0.976
5% Shapiro Wilk Critical Value	0.926	5% Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	9.269	Mean	1.801
SD	8.104	SD	1.028
95% DL/2 (t) UCL	11.55	95% H-Stat (DL/2) UCL	15.63
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	8.178	Mean in Log Scale	1.895
SD	9.516	SD in Log Scale	0.888
95% MLE (t) UCL	10.86	Mean in Original Scale	9.423
95% MLE (Tiku) UCL	10.94	SD in Original Scale	7.955
		95% t UCL	11.66

95% Percentile Bootstrap UCL	11.72
95% BCA Bootstrap UCL	12.14
95% H UCL	13.85

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.121
Theta Star	5.283
nu star	123
A-D Test Statistic	0.234
5% A-D Critical Value	0.756
K-S Test Statistic	0.756
5% K-S Critical Value	0.164

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	0.000001
Maximum	36.1
Mean	9.025
Median	7.55
SD	8.364
k star	0.23
Theta star	39.29
Nu star	16.54
AppChi2	8.342
95% Gamma Approximate UCL	17.89
95% Adjusted Gamma UCL	18.48

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	9.363
SD	7.899
SE of Mean	1.34
95% KM (t) UCL	11.63
95% KM (z) UCL	11.57
95% KM (jackknife) UCL	11.6
95% KM (bootstrap t) UCL	12.23
95% KM (BCA) UCL	12.15
95% KM (Percentile Bootstrap) UCL	11.83
95% KM (Chebyshev) UCL	15.2
97.5% KM (Chebyshev) UCL	17.73
99% KM (Chebyshev) UCL	22.69

Potential UCLs to Use

95% KM (BCA) UCL	12.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

Lagoon Sediment ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	15	Number of Detected Data	13
Number of Distinct Detected Data	10	Number of Non-Detect Data	2
		Percent Non-Detects	13.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.6	Minimum Detected	0.47
Maximum Detected	3.3	Maximum Detected	1.194
Mean of Detected	2.3	Mean of Detected	0.808
SD of Detected	0.534	SD of Detected	0.231
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	2.2	Maximum Non-Detect	0.788

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	7
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	53.33%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Test Statistic	0.953
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.133	Mean	0.707
SD	0.662	SD	0.343
95% DL/2 (t) UCL	2.434	95% H-Stat (DL/2) UCL	2.563
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	2.163	Mean in Log Scale	0.778
SD	0.619	SD in Log Scale	0.228
95% MLE (t) UCL	2.444	Mean in Original Scale	2.233
95% MLE (Tiku) UCL	2.522	SD in Original Scale	0.526
		95% t UCL	2.472

Attachment K-4

Lagoon Sediment ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

95% Percentile Bootstrap UCL	2.442
95% BCA Bootstrap UCL	2.471
95% H UCL	2.499

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	15.82
Theta Star	0.145
nu star	411.3
A-D Test Statistic	0.296
5% A-D Critical Value	0.733
K-S Test Statistic	0.733
5% K-S Critical Value	0.236

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	1.6
Maximum	3.3
Mean	2.238
Median	2.1
SD	0.522
k star	16.68
Theta star	0.134
Nu star	500.4
AppChi2	449.5
95% Gamma Approximate UCL	2.492
95% Adjusted Gamma UCL	2.525

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	2.23
SD	0.513
SE of Mean	0.139
95% KM (t) UCL	2.474
95% KM (z) UCL	2.458
95% KM (jackknife) UCL	2.474
95% KM (bootstrap t) UCL	2.522
95% KM (BCA) UCL	2.473
95% KM (Percentile Bootstrap) UCL	2.46
95% KM (Chebyshev) UCL	2.835
97.5% KM (Chebyshev) UCL	3.097
99% KM (Chebyshev) UCL	3.611

Potential UCLs to Use

95% KM (t) UCL	2.474
95% KM (Percentile Bootstrap) UCL	2.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

Uplands Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Observations	17	Number of Distinct Observations	17

Raw Statistics		Log-transformed Statistics	
Minimum	5.4	Minimum of Log Data	1.686
Maximum	36.1	Maximum of Log Data	3.586
Mean	13.91	Mean of log Data	2.49
Median	12.6	SD of log Data	0.536
SD	8.284		
Std. Error of Mean	2.009		
Coefficient of Variation	0.596		
Skewness	1.527		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.845	Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.892	Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	17.41	95% H-UCL	18.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21.92
95% Adjusted-CLT UCL (Chen-1995)	18.01	97.5% Chebyshev (MVUE) UCL	25.44
95% Modified-t UCL (Johnson-1978)	17.54	99% Chebyshev (MVUE) UCL	32.34

Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.069	Data appear Gamma Distributed at 5% Significance Level
Theta Star	4.531	
MLE of Mean	13.91	
MLE of Standard Deviation	7.938	
nu star	104.3	
Approximate Chi Square Value (.05)	81.77	**Nonparametric Statistics**
Adjusted Level of Significance	0.0346	95% CLT UCL 17.21
Adjusted Chi Square Value	79.68	95% Jackknife UCL 17.41

Attachment K-4

Uplands Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

		95% Standard Bootstrap UCL	17.03
Anderson-Darling Test Statistic	0.396	95% Bootstrap-t UCL	18.68
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	19.08
Kolmogorov-Smirnov Test Statistic	0.159	95% Percentile Bootstrap UCL	17.29
Kolmogorov-Smirnov 5% Critical Value	0.21	95% BCA Bootstrap UCL	18.09
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.66
		97.5% Chebyshev(Mean, Sd) UCL	26.45
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	33.9
95% Approximate Gamma UCL	17.74		
95% Adjusted Gamma UCL	18.21		
Potential UCL to Use		Use 95% Approximate Gamma UCL	17.74

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Attachment K-4

Lowlands Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	7	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	1
		Percent Non-Detects	14.29%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.9	Minimum Detected	1.361
Maximum Detected	21.7	Maximum Detected	3.077
Mean of Detected	9.267	Mean of Detected	2.073
SD of Detected	6.363	SD of Detected	0.575
Minimum Non-Detect	3	Minimum Non-Detect	1.099
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.773	Shapiro Wilk Test Statistic	0.938
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	8.157	Mean	1.835
SD	6.508	SD	0.82
95% DL/2 (t) UCL	12.94	95% H-Stat (DL/2) UCL	25.68
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	7.828	Mean in Log Scale	1.87

Attachment K-4

Lowlands Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

SD	6.538
95% MLE (t) UCL	12.63
95% MLE (Tiku) UCL	12.56

SD in Log Scale	0.752
Mean in Original Scale	8.217
SD in Original Scale	6.439
95% t UCL	12.95
95% Percentile Bootstrap UCL	12.25
95% BCA Bootstrap UCL	13.89
95% H UCL	21.81

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.822
Theta Star	5.085
nu star	21.87
A-D Test Statistic	0.428
5% A-D Critical Value	0.701
K-S Test Statistic	0.701
5% K-S Critical Value	0.334

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	0.000001
Maximum	21.7
Mean	7.943
Median	6.8
SD	6.783
k star	0.269
Theta star	29.57
Nu star	3.76
AppChi2	0.629
95% Gamma Approximate UCL	47.46
95% Adjusted Gamma UCL	87.62

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	8.5
SD	5.696
SE of Mean	2.358
95% KM (t) UCL	13.08
95% KM (z) UCL	12.38
95% KM (jackknife) UCL	12.94
95% KM (bootstrap t) UCL	18.89
95% KM (BCA) UCL	13.13
95% KM (Percentile Bootstrap) UCL	12.97
95% KM (Chebyshev) UCL	18.78
97.5% KM (Chebyshev) UCL	23.23
99% KM (Chebyshev) UCL	31.96

Potential UCLs to Use

95% KM (BCA) UCL	13.13

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

Lagoon Fringe Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	10	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	5
		Percent Non-Detects	50.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.9	Minimum Detected	0.642
Maximum Detected	13.5	Maximum Detected	2.603
Mean of Detected	6.24	Mean of Detected	1.627
SD of Detected	4.467	SD of Detected	0.726
Minimum Non-Detect	1.7	Minimum Non-Detect	0.531
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	60.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.994
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.7	Mean	0.873
SD	4.01	SD	0.947
95% DL/2 (t) UCL	6.025	95% H-Stat (DL/2) UCL	9.656

Attachment K-4

Lagoon Fringe Surface Soil - IS + Discrete - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Maximum Likelihood Estimate(MLE) Method	
Mean	1.292
SD	6.337
95% MLE (t) UCL	4.966
95% MLE (Tiku) UCL	6.49

Log ROS Method	
Mean in Log Scale	0.689
SD in Log Scale	1.127
Mean in Original Scale	3.532
SD in Original Scale	4.131
95% t UCL	5.927
95% Percentile Bootstrap UCL	5.661
95% BCA Bootstrap UCL	6.437
95% H UCL	13.33

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.175
Theta Star	5.311
nu star	11.75
A-D Test Statistic	0.201
5% A-D Critical Value	0.683
K-S Test Statistic	0.683
5% K-S Critical Value	0.36

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	13.5
Mean	3.12
Median	0.95
SD	4.437
k star	0.144
Theta star	21.63
Nu star	2.885
AppChi2	0.339
95% Gamma Approximate UCL	26.54
95% Adjusted Gamma UCL	38.81

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	4.07
SD	3.563
SE of Mean	1.26
95% KM (t) UCL	6.379
95% KM (z) UCL	6.142
95% KM (jackknife) UCL	6.188
95% KM (bootstrap t) UCL	7.444
95% KM (BCA) UCL	7.74
95% KM (Percentile Bootstrap) UCL	7.19
95% KM (Chebyshev) UCL	9.56
97.5% KM (Chebyshev) UCL	11.94
99% KM (Chebyshev) UCL	16.6

Potential UCLs to Use

95% KM (t) UCL	6.379
95% KM (Percentile Bootstrap) UCL	7.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

ProUCL Output

Discrete Samples Only

Attachment K-4

Site-wide Surface Soil - Discrete Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	9	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	3
		Percent Non-Detects	33.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	3.9	Minimum Detected	1.361
Maximum Detected	23.8	Maximum Detected	3.17
Mean of Detected	12.65	Mean of Detected	2.324
SD of Detected	8.484	SD of Detected	0.738
Minimum Non-Detect	1.7	Minimum Non-Detect	0.531
Maximum Non-Detect	2	Maximum Non-Detect	0.693

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	3
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	6
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	33.33%

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.88	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	8.744	Mean	1.526
SD	8.905	SD	1.333
95% DL/2 (t) UCL	14.26	95% H-Stat (DL/2) UCL	74.39

Attachment K-4

Site-wide Surface Soil - Discrete Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Maximum Likelihood Estimate(MLE) Method	
Mean	6.634
SD	11.14
95% MLE (t) UCL	13.54
95% MLE (Tiku) UCL	14.11

Log ROS Method	
Mean in Log Scale	1.69
SD in Log Scale	1.116
Mean in Original Scale	8.941
SD in Original Scale	8.714
95% t UCL	14.34
95% Percentile Bootstrap UCL	13.5
95% BCA Bootstrap UCL	14.36
95% H UCL	40.27

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.36
Theta Star	9.303
nu star	16.32
A-D Test Statistic	0.348
5% A-D Critical Value	0.703
K-S Test Statistic	0.703
5% K-S Critical Value	0.335

Data appear Gamma Distributed at 5% Significance Level

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	23.8
Mean	8.433
Median	5.9
SD	9.219
k star	0.173
Theta star	48.75
Nu star	3.114
AppChi2	0.407
95% Gamma Approximate UCL	64.53
95% Adjusted Gamma UCL	101.8

Note: DL/2 is not a recommended method.

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	9.733
SD	7.55
SE of Mean	2.757
95% KM (t) UCL	14.86
95% KM (z) UCL	14.27
95% KM (jackknife) UCL	14.5
95% KM (bootstrap t) UCL	18.32
95% KM (BCA) UCL	16.14
95% KM (Percentile Bootstrap) UCL	14.77
95% KM (Chebyshev) UCL	21.75
97.5% KM (Chebyshev) UCL	26.95
99% KM (Chebyshev) UCL	37.16

Potential UCLs to Use

95% KM (t) UCL	14.86
95% KM (Percentile Bootstrap) UCL	14.77

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

ProUCL Output

Incremental Samples Only

Attachment K-4

Site-wide Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	27	Number of Detected Data	23
Number of Distinct Detected Data	22	Number of Non-Detect Data	4
		Percent Non-Detects	14.81%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.7	Minimum Detected	0.531
Maximum Detected	36.1	Maximum Detected	3.586
Mean of Detected	10.83	Mean of Detected	2.152
SD of Detected	7.876	SD of Detected	0.722
Minimum Non-Detect	3	Minimum Non-Detect	1.099
Maximum Non-Detect	3	Maximum Non-Detect	1.099

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.823	Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.914	5% Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	9.444	Mean	1.893
SD	7.993	SD	0.917
95% DL/2 (t) UCL	12.07	95% H-Stat (DL/2) UCL	15.6
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	8.502	Mean in Log Scale	1.957
SD	9.173	SD in Log Scale	0.823
95% MLE (t) UCL	11.51	Mean in Original Scale	9.575
95% MLE (Tiku) UCL	11.57	SD in Original Scale	7.867
		95% t UCL	12.16
		95% Percentile Bootstrap UCL	12.3
		95% BCA Bootstrap UCL	12.72
		95% H UCL	14.4

Attachment K-4

Site-wide Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	2.052
Theta Star	5.276
nu star	94.39
A-D Test Statistic	0.302
5% A-D Critical Value	0.753
K-S Test Statistic	0.753
5% K-S Critical Value	0.183

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	0.000001
Maximum	36.1
Mean	9.241
Median	8
SD	8.216
k star	0.332
Theta star	27.85
Nu star	17.92
AppChi2	9.33
95% Gamma Approximate UCL	17.75
95% Adjusted Gamma UCL	18.53

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	9.489
SD	7.799
SE of Mean	1.535
95% KM (t) UCL	12.11
95% KM (z) UCL	12.01
95% KM (jackknife) UCL	12.1
95% KM (bootstrap t) UCL	12.89
95% KM (BCA) UCL	12.46
95% KM (Percentile Bootstrap) UCL	12.26
95% KM (Chebyshev) UCL	16.18
97.5% KM (Chebyshev) UCL	19.07
99% KM (Chebyshev) UCL	24.76

Potential UCLs to Use

95% KM (BCA) UCL	12.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

Uplands Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	Macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Observations	15	Number of Distinct Observations	15

Raw Statistics		Log-transformed Statistics	
Minimum	5.4	Minimum of Log Data	1.686
Maximum	36.1	Maximum of Log Data	3.586
Mean	13.78	Mean of log Data	2.493
Median	12.6	SD of log Data	0.509
SD	8.176		
Std. Error of Mean	2.111		
Coefficient of Variation	0.593		
Skewness	1.833		

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.802	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	17.5	95% H-UCL	18.27
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21.7
95% Adjusted-CLT UCL (Chen-1995)	18.32	97.5% Chebyshev (MVUE) UCL	25.18
95% Modified-t UCL (Johnson-1978)	17.66	99% Chebyshev (MVUE) UCL	32.03

Gamma Distribution Test		Data Distribution
k star (bias corrected)	3.236	Data appear Gamma Distributed at 5% Significance Level
Theta Star	4.258	
MLE of Mean	13.78	
MLE of Standard Deviation	7.66	
nu star	97.08	

Attachment K-4

Uplands Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Approximate Chi Square Value (.05)	75.36
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	73
Anderson-Darling Test Statistic	0.49
Anderson-Darling 5% Critical Value	0.74
Kolmogorov-Smirnov Test Statistic	0.188
Kolmogorov-Smirnov 5% Critical Value	0.223
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
95% Approximate Gamma UCL	17.75
95% Adjusted Gamma UCL	18.33
Potential UCL to Use	Use 95% Approximate Gamma UCL 17.75

Nonparametric Statistics

95% CLT UCL	17.25
95% Jackknife UCL	17.5
95% Standard Bootstrap UCL	17.21
95% Bootstrap-t UCL	20.98
95% Hall's Bootstrap UCL	38.68
95% Percentile Bootstrap UCL	17.49
95% BCA Bootstrap UCL	18.56
95% Chebyshev(Mean, Sd) UCL	22.98
97.5% Chebyshev(Mean, Sd) UCL	26.96
99% Chebyshev(Mean, Sd) UCL	34.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Attachment K-4

Lowlands Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	Macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	5	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	1
		Percent Non-Detects	20.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	5.9	Minimum Detected	1.775
Maximum Detected	9.3	Maximum Detected	2.23
Mean of Detected	7.5	Mean of Detected	2
SD of Detected	1.476	SD of Detected	0.197
Minimum Non-Detect	3	Minimum Non-Detect	1.099
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Test Statistic	0.99
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.3	Mean	1.681
SD	2.972	SD	0.733
95% DL/2 (t) UCL	9.134	95% H-Stat (DL/2) UCL	28.25
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	7.5	Mean in Log Scale	1.894
SD	1.279	SD in Log Scale	0.294
95% MLE (t) UCL	8.719	Mean in Original Scale	6.867
95% MLE (Tiku) UCL	8.863	SD in Original Scale	1.908
		95% t UCL	8.686
		95% Percentile Bootstrap UCL	8.12
		95% BCA Bootstrap UCL	8.1
		95% H UCL	9.847

Attachment K-4

Lowlands Surface Soil - IS Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	8.787
Theta Star	0.854
nu star	70.3
A-D Test Statistic	0.21
5% A-D Critical Value	0.657
K-S Test Statistic	0.657
5% K-S Critical Value	0.394

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	2.267
Maximum	9.3
Mean	6.453
Median	6.8
SD	2.667
k star	2.185
Theta star	2.953
Nu star	21.85
AppChi2	12.23
95% Gamma Approximate UCL	11.53
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	7.18
SD	1.311
SE of Mean	0.677
95% KM (t) UCL	8.623
95% KM (z) UCL	8.293
95% KM (jackknife) UCL	8.619
95% KM (bootstrap t) UCL	8.566
95% KM (BCA) UCL	8.52
95% KM (Percentile Bootstrap) UCL	8.52
95% KM (Chebyshev) UCL	10.13
97.5% KM (Chebyshev) UCL	11.41
99% KM (Chebyshev) UCL	13.91

Potential UCLs to Use

95% KM (t) UCL	8.623
95% KM (Percentile Bootstrap) UCL	8.52

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Attachment K-4

Lagoon Fringe Surface Soil - Incremental Samples Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	Macro.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (MG/KG)

General Statistics

Number of Valid Data	5	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	2
		Percent Non-Detects	40.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.9	Minimum Detected	0.642
Maximum Detected	4.8	Maximum Detected	1.569
Mean of Detected	3.533	Mean of Detected	1.19
SD of Detected	1.484	SD of Detected	0.486
Minimum Non-Detect	3	Minimum Non-Detect	1.099
Maximum Non-Detect	3	Maximum Non-Detect	1.099

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.954	Shapiro Wilk Test Statistic	0.908
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.72	Mean	0.876
SD	1.53	SD	0.551
95% DL/2 (t) UCL	4.179	95% H-Stat (DL/2) UCL	6.587

Attachment K-4

Lagoon Fringe Surface Soil - Incremental Samples Only - ProUCL Output

Eastern Conservation Area

Former VNTR, Vieques, Puerto Rico

Maximum Likelihood Estimate(MLE) Method	N/A

MLE method failed to converge properly

Log ROS Method	
Mean in Log Scale	0.971
SD in Log Scale	0.472
Mean in Original Scale	2.891
SD in Original Scale	1.389
95% t UCL	4.215
95% Percentile Bootstrap UCL	3.86
95% BCA Bootstrap UCL	3.93
95% H-UCL	5.801

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A
A-D Test Statistic	N/A
5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	
Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only

Data appear Normal at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method	
Mean	2.88
SD	1.234
SE of Mean	0.676
95% KM (t) UCL	4.32
95% KM (z) UCL	3.991
95% KM (jackknife) UCL	4.614
95% KM (bootstrap t) UCL	3.829
95% KM (BCA) UCL	4.8
95% KM (Percentile Bootstrap) UCL	4.8
95% KM (Chebyshev) UCL	5.825
97.5% KM (Chebyshev) UCL	7.099
99% KM (Chebyshev) UCL	9.602

Potential UCLs to Use

95% KM (t) UCL	4.32
95% KM (Percentile Bootstrap) UCL	4.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Appendix L
Ecological Risk Assessment

Contents

Section Page

Ecological Risk Assessment L-1
1.1 Introduction L-1
1.1.1 Ecological Risk Assessment Process L-1
1.2 Problem Formulation L-3
1.2.1 Ecological Setting L-3
1.2.2 Summary of Available Analytical Data L-5
1.2.3 Conceptual Site Model L-6
1.3 Exposure Assessment L-10
1.3.1 Selection Criteria for Analytical Data L-11
1.3.2 Data Groupings L-11
1.3.3 Exposure Point Concentrations L-11
1.3.4 Dietary Intakes L-15
1.4 Effects Assessment L-16
1.4.1 Medium-Specific ESVs L-16
1.4.2 Ingestion TRVs L-17
1.4.3 Bioavailability Measures L-17
1.5 Risk Characterization L-18
1.5.1 Methodology L-18
1.5.2 Terrestrial Habitats – ECA SMI Surface Soil L-19
1.5.3 Terrestrial Habitats – Lagoon Fringe Area Discrete Samples L-20
1.5.4 Terrestrial Habitats – Beach Area Discrete Samples L-20
1.5.5 Terrestrial Habitats – Upland Area Discrete Sample L-21
1.5.6 Aquatic Habitats – ECA Lagoon L-21
1.5.7 Risk Evaluation L-23
1.5.8 Risk Summary and Conclusions L-24
1.6 Uncertainties L-24
1.7 References L-27

Tables

L-1 Water Column Parameter Measurements - ECA Lagoon
L-2 Physical Sediment Parameter Measurements - ECA Lagoon
L-3 Animals and Plants Observed at the ECA
L-4 Federally Listed Species Occurring or Potentially Occurring at NASD Vieques
L-5 Samples Used in the Ecological Risk Assessment
L-6 Physical Parameter Measurements - Surface Soil
L-7 Assessment Endpoints, Risk Hypotheses, and Measurement Endpoints
L-8 Bioaccumulative Chemicals List and Log Kow Values
L-9 Soil Bioconcentration Factors For Plants (Dry Weight)
L-10 Soil Bioconcentration Factors For Plants (Dry Weight)
L-11 Soil Bioaccumulation Factors For Soil Invertebrates (Dry Weight)
L-12 Soil Bioaccumulation Factors For Small Mammals (Dry Weight) - Omnivores
L-13 Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Benthic Invertebrates
L-14 Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Fish
L-15 Exposure Parameters for Upper Trophic Level Ecological Receptors - Screening

L-16 Exposure Parameters for Upper Trophic Level Ecological Receptors - Baseline
L-17 Soil Ecological Screening Values (ESVs) for Plants and Soil Invertebrates
L-18 Marine Surface Water Ecological Screening Values (ESVs)
L-19 Marine Sediment Ecological Screening Values (ESVs)
L-20 Uncertainty Factors
L-21 Eco-SSL Values for Birds and Mammals
L-22 Ingestion-Based Toxicity Reference Values (TRVs) for Mammals
L-23 Ingestion-Based Toxicity Reference Values (TRVs) for Birds
L-24 Background Data and Upper Tolerance Limits (UTLs) - Surface Soil
L-25 Screening Statistics for Plants and Soil Invertebrates - ECA Surface Soil (SMI, 0 - 2 inches) - Decision Units 1-4
L-26 Screening Statistics - ECA Surface Soil (SMI, 0 - 2 inches) - Mammal/Bird Eco-SSLs
L-27 Hazard Quotients for Terrestrial Food Web Exposures - Step 2 (Screening) - Maximum
L-28 Hazard Quotients for Terrestrial Food Web Exposures - Step 3A (Baseline) - 95% UCL
L-29 Hazard Quotients for Terrestrial Food Web Exposures - Step 3A (Baseline) - 95% UCL
L-30 Screening Statistics - ECA Discrete Deeper Surface Soil (2 - up to 24 inches) - Lagoon Fringe
L-31 Screening Statistics - ECA Discrete Deeper Surface Soil (18 - 24 inches) - Beach
L-32 Screening Statistics - ECA Discrete Deeper Surface Soil (2 - 18 inches) - Upland
L-33 Screening Statistics - Surface Water - ECA Lagoon
L-34 Screening Statistics - Sediment - ECA Lagoon
L-35 Hazard Quotients for Aquatic Food Web Exposures - Step 2 (Screening) - Maximum - ECA Lagoon
L-36 Hazard Quotients for Aquatic Food Web Exposures - Step 3A (Baseline) - 95% UCL - ECA Lagoon
L-37 Hazard Quotients for Aquatic Food Web Exposures - Step 3A (Baseline) - Mean - ECA Lagoon
L-38 Recalculated Upper Trophic Level Aquatic Receptor Exposure Doses and Hazard Quotients for Selenium - Baseline (Step 3A) - Mean
L-39 Reporting Limit to Screening Value Comparison

Figures

L-1 ECA Sample Location Map
L-2 Ecological Conceptual Site Model

Attachments

L-1 Terrestrial Food Web Calculations

L-2 Aquatic Food Web Calculations

APPENDIX L

Ecological Risk Assessment

1.1 Introduction

This appendix contains a screening ecological risk assessment (SERA), constituting Steps 1 and 2 of the ecological risk assessment (ERA) process, and the first step (Step 3A) of a baseline ecological risk assessment (BERA) for the Eastern Conservation Area (ECA). The ECA is located within the former Vieques Naval Training Range, Vieques, Puerto Rico.

The approach, methods, and assumptions used for this ERA were based upon the final ERA protocol presented in the *Master Standard Operating Procedures, Protocols, and Plans* (CH2M HILL, 2010a), the *Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration Program – Update 1 (Addendum)* (CH2M HILL, 2010b), the ERA interim deliverable for the ECA (CH2M HILL, 2010c), and the regulator comments on the interim deliverable.

1.1.1 Ecological Risk Assessment Process

This ERA was conducted in accordance with the *Navy Policy for Conducting Ecological Risk Assessments* (CNO, 1999) and the Navy guidance for implementing this ERA policy (NAVFAC, 2003). The Navy ERA policy and guidance, which describe a process consisting of eight steps organized into three tiers, are conceptually similar to the eight-step ERA process outlined in U.S. Environmental Protection Agency (USEPA) ERA guidance for the Superfund program (USEPA, 1997a). For both sets of guidance, Steps 1 and 2 involve conducting a SERA using very conservative assumptions. The BERA represents Steps 3 through 7. The BERA uses more realistic assumptions and site-specific data to refine the risk estimates from the SERA for components that fail the initial screen. Step 8 addresses risk management issues. The major differences between the Navy ERA policy/guidance and the USEPA ERA guidance are:

1. The Navy policy/guidance provides clearly defined criteria for exiting the ERA process at specific points.
2. The Navy policy/guidance divides Step 3 (the first step of the BERA) into two distinct sub-steps (Steps 3A and 3B), with a potential exit point after Step 3A.
3. The Navy policy/guidance incorporates risk management considerations throughout all tiers of the ERA process.

ERAs are conducted using a tiered, step-wise approach and are punctuated with Scientific Management Decision Points (SMDPs). SMDPs represent points in the ERA process where agreement on conclusions, actions, or methodologies is needed so that the ERA process can continue (or terminate) in a technically defensible manner. The results of the ERA at a particular SMDP are used to determine how the ERA process should proceed, for example, to the next step in the process or directly to a later step. The process continues until a final decision has been reached (i.e., remedial action or controls if unacceptable risks are identified, or no further action if risks are acceptable). The process can also be iterative if data needs are identified at any step; the needed data are collected and the process starts again at the point appropriate to the type of data collected.

The screening (preliminary) problem formulation is the first step of an ERA and establishes the goals, scope, and focus of the SERA. As part of problem formulation, the environmental setting of the site is characterized in terms of the habitats and biota known or likely to be present. The types and concentrations of chemicals that are present in ecologically relevant media (such as surface water, surface sediment, and surface soil) are also described. A preliminary conceptual model is developed that describes potential source areas, potential transport pathways (the mechanisms whereby chemicals may be transported from a source of contamination to ecologically relevant media), potential exposure pathways (an exposure pathway links a potential source of contamination with one or more receptors through exposure via one or more media and exposure routes), potential exposure routes (e.g., ingestion), and potential receptors. Assessment endpoints, measurement endpoints, and risk hypotheses are then selected to evaluate those receptors for which complete and potentially significant exposure pathways are likely to

exist[1]. The fate, transport, and toxicological properties of the chemicals present at the site, particularly the potential for bioaccumulation, are also considered during the problem formulation process.

Step 1 of the ERA process is intended to answer two main questions:

1. Do complete exposure pathways exist?
2. Are sufficient data available to conduct the SERA?

If no complete exposure pathways exist, the ERA process terminates at Step 1 with a conclusion of negligible (acceptable) risk because exposure, and thus potential risk, can only occur if complete exposure pathways exist. If one or more complete exposure pathways are known to exist, or are likely to exist, the ERA process continues to Step 2 but only evaluates those pathways that have been determined to be "critical" (ecologically important), that is, represent exposures to sensitive receptors that are associated with the predominant fate and transport mechanisms at the site (USEPA, 1997a). An evaluation of the available data is then conducted to determine if they are adequate to support the SERA. If not, additional data are collected before the ERA process continues. The second step of the ERA process involves conducting a screening exposure assessment, a screening effects assessment, and a screening risk calculation (risk characterization) based upon very conservative assumptions.

The results of the SERA are used to evaluate the potential for unacceptable ecological risks based upon very conservative assumptions. If the results of the SERA suggest that further ecological risk evaluation is warranted, the ERA process proceeds to the BERA (Steps 3 through 7), which is a more detailed phase of the ERA process, for the pathways, chemicals, receptors, and areas identified in the SERA. As indicated above, the first step of the BERA (Step 3) is divided into two distinct sub-steps (3A and 3B) in Navy ERA guidance.

Step 3 of the USEPA ERA guidance consists of the following activities (USEPA, 1997a):

1. Refinement of the Chemicals of Potential Concern (COPCs) from the SERA.
2. Further characterizing the potential ecological effects of contaminants.
3. Refining information on contaminant fate and transport, complete exposure pathways, and receptors potentially at risk.
4. Selecting assessment endpoints.
5. Refining the conceptual model and risk hypotheses from the SERA.

Step 3A of the Navy policy/guidance (refinement of conservative exposure assumptions) corresponds to the first activity listed above for the USEPA ERA guidance. In Step 3A, a refined evaluation of exposure estimates is conducted using more realistic assumptions and additional methodologies relative to those used in the SERA, which is intended to be a very conservative assessment. Examples of more realistic exposure assumptions include using central tendency (e.g., mean) estimates (rather than maximums) for media concentrations, bioaccumulation factors, and exposure parameters. Examples of additional methodologies include consideration of background and upgradient concentrations, bioavailability, and detection frequency (CNO, 1999; NAVFAC, 2003).

If risk estimates (and their associated uncertainty) are acceptable following Step 3A, the site will meet the conditions of the exit criterion specified in the Navy guidance. If the Step 3A evaluation does not support a determination of acceptable risk within acceptable uncertainty, the site continues to Step 3B.

Step 3B of the Navy policy/guidance (problem formulation) corresponds conceptually to the last four activities of Step 3 listed above for the USEPA ERA guidance. In Step 3B, the preliminary conceptual model from the SERA is refined based upon the results of the Step 3A evaluation to develop a revised list of key receptors, critical exposure pathways, key COPCs, assessment endpoints, measurement endpoints, and risk hypotheses. Based upon the refined conceptual model, the lines of evidence to be used in characterizing risk are determined. Agreement on the

[1] An assessment endpoint is an explicit expression of the environmental component or value that is to be protected. A measurement endpoint is a measurable ecological characteristic that is related to the component or value chosen as the assessment endpoint. Risk hypotheses are testable hypotheses about the relationship among the assessment endpoints and their predicted responses when exposed to contaminants or other stressors.

refined conceptual model, COPCs, exposure pathways, endpoints, and risk hypotheses constitutes the SMDP at the end of Step 3 in both Navy and USEPA ERA guidance.

Following the completion of Step 3, a decision point is reached with two potential outcomes. If the refined risk estimates are acceptable for each selected assessment endpoint, the investigation proceeds to risk characterization (Step 7) to document this conclusion and the ERA process terminates. If the uncertainties associated with the refined risk estimates are unacceptable and/or the risk estimates indicate that unacceptable risks may exist, site-specific studies might be required and the ERA process continues (Steps 4 through 6). Step 4 is a work planning step where additional site-specific studies are scoped and designed. Step 5 consists of the verification of the field sampling design developed in Step 4 while Step 6 constitutes the site investigation and data analysis phase of the process. The scope (e.g., spatial extent of sampling) and components (e.g., collection of biological data, such as tissue samples, toxicity testing, etc.) of any site-specific studies are determined by the conclusions of Step 3 and the pathways/endpoints associated with the potential unacceptable risks.

Step 7 consists of the documentation and synthesis of the information and data identified in Steps 1 through 3 (no additional study) or Steps 1 through 6 (additional study). In this step, risk is evaluated and characterized using both quantitative and qualitative methods. Conclusions are made as to whether there is a reasonable potential for unacceptable ecological risk and, if there is a potential for unacceptable ecological risk, the magnitude of that risk. The results of the completed BERA (Step 7) are used to make necessary risk management decisions (Step 8) related to current or future risks. Possible decisions include:

- Adequate information exists to conclude that no unacceptable ecological risks exist. The assessment should stop at Step 7.
- Adequate information exists to conclude that unacceptable ecological risks exist for which remedial actions or controls are warranted. Whether remedial actions or controls are taken, and the specific actions or controls taken, will depend upon a number of risk management factors such as the results of human health risk assessments (if applicable) and the potential impact of the remedial action or control itself on the habitats and biota present. This analysis would occur as part of Step 8.
- Adequate information does not exist to estimate risk or the risk estimate is believed to be too conservative or uncertain to recommend remediation. The assessment should be refined.

1.2 Problem Formulation

Problem formulation establishes the goals, scope, and focus of the ERA. As part of problem formulation, the ecological setting of the ECA is characterized in terms of the habitats and biota known or likely to be present. The types and concentrations of chemicals that are present in ecologically relevant media (surface soil, surface water, and sediment) are also described based upon available analytical data. A conceptual site model is developed that describes source areas, transport pathways and exposure media, exposure pathways and routes, and receptors. Assessment endpoints, measurement endpoints, and risk hypotheses are developed to evaluate those receptors for which critical exposure pathways exist. The fate, transport, and toxicological properties of the chemicals present at the ECA, particularly the potential for bioaccumulation, are also considered during this process.

1.2.1 Ecological Setting

The ECA is about 133 acres in size and is part of the Vieques National Wildlife Refuge. The ECA was not used as operational target area for munitions; however, the ECA is located adjacent to the Live Impact Area (LIA) (UXO Sites 2, 3, and 4) where naval gunfire and air-to-ground (ATG) training activities occurred from the 1970s through 2003. Munitions and explosives of concern (MEC) have been identified within the ECA, most likely from munitions directed toward the LIA that missed their intended target.

1.2.1.1 Habitats and Biota

The description of the environmental setting is based primarily on a biological assessment (BA) for the ECA conducted by Geo-Marine, Inc. (GMI) (Geo-Marine, 2007) which included a survey of listed biological species and

critical habitats. A supplemental qualitative survey of the ECA (inland) Lagoon was conducted during the Remedial Investigation (RI) field sampling activities (February 2011).

Bahia Playa Blanca, the offsite coastal lagoon at the north side of the ECA (Figure L-1), is not part of the ECA (UXO 01) and is therefore not evaluated as part of the ECA RI. It will be evaluated separately as part of the UXO 16 (Underwater Areas) investigation, as warranted. Generally, the near shore portion of this lagoon (extending about 1,500 feet offshore) consists of a sandy bottom with sparse (10 to 30 percent) sea grass within the first 500 feet, followed by about 1,000 feet of dense coral reef. A wide variety of marine fish and invertebrates would be expected to occur in this area, along with many species of foraging seabirds.

Habitats types within the ECA generally include upland, lowland, lagoon, and beach. The upland habitat type, which occurs at the higher elevations (above about 30 feet) and encompasses the majority of the ECA, is characterized primarily by rough terrain of limestone and dolomite outcroppings. The predominant soil type is rocky land which consists of areas where rock crops out on 50 to 70 percent of the surface, has common loose stones, and has very shallow soil material between outcrops and stones. The lowland habitat type generally occurs below an elevation of about 15 feet above mean sea level, where the water table is high or periodically high; the lowland area surrounds the ECA Lagoon and borders the beach (Bahia Playa Blanca). The beach along Bahia Playa Blanca consists of a narrow strip of light-colored beach sand that is saturated with seawater, contains many seashells and shell fragments, and serves as a sea turtle nesting area.

In 2001, GMI conducted an evaluation of the general health and status of the mangrove communities on Navy property on the eastern end of Vieques Island (Geo-Marine, 2002). In this report, the ECA Lagoon is described as an 8.6-acre closed (isolated from the ocean) lagoon (includes open water and/or exposed mudflats, depending upon hydrologic conditions) with 1.0 acres of mangrove, and has an assigned USFWS wetland classification code of E2SS3P (estuarine, intertidal, scrub-shrub, broad-leaved evergreen, irregularly flooded). A review of aerial photos showed that the ECA Lagoon has been isolated from the adjacent ocean since 1936. In 1936, the lagoon contained about 100 percent coverage of vegetation, probably mangrove species, but showed a slow decline in coverage until 1985 when nearly all vegetation was absent, replaced with either open water or mudflat.

Vegetation ranges from low-growing, dense vegetation along the eastern edge to forested areas along the west and northwest portions of the ECA. Six distinct plant communities were identified, including upland, evergreen scrub (also known as subtropical dry forest; 89.9 acres), lowland, forest scrub (18.9 acres), beach (9.5 acres), mangroves (1.0 acres) associated with the ECA Lagoon, salt/sand flat (0.2 acres), and sparse thorn scrub (0.1 acres).

In February 2011, the ECA Lagoon contained about 1 foot of water and was relatively turbid (Table L-1). The average salinity of 20.7 parts per thousand (ppt), while less than that of seawater, indicated a marine environment. In October 2007, field water quality parameters were measured by NOAA at three ECA Lagoon stations (Bauer and Kendall, 2010). These measurements indicated a salinity of 77.6 ppt (measured only in one sample) and a very shallow water depth of about 1 inch across the lagoon (Table L-1). The lagoon substrate was predominantly silt/clay (Table L-2).

1.2.1.2 Flora

Plants observed within the ECA Lagoon during the RI sampling activities are listed in Table L-3. Patches of black mangrove (*Avicennia germinans*) and red mangrove (*Rhizophora mangle*) occurred along the lagoon fringe, except for along the western shoreline. A dense groundcover of seaside purslane (*Sesuvium portulacstrum*) grew in the saturated soils of the entire lagoon shoreline, with seashore dropseed (*Sporobolus virginicus*) growing in dense stands further up the shoreline. Extensive areas of widgeon grass (*Ruppi maritima*), a bushy, fan-like underwater plant well adapted to brackish and alkaline water bodies, occurred throughout the lagoon. Widgeon grass is known to provide cover and food for many aquatic wildlife species, such as ducks.

A total of 155 plant species were identified by GMI (Geo-Marine, 2007) throughout the ECA, primarily in the upland areas. No plant identified as endangered, threatened, or rare was observed. A list of these species, other than those already reported above as associated with the ECA Lagoon, is included in Table L-3.

1.2.1.3 Fauna

A list of mammals, birds, and aquatic invertebrates observed in and around the ECA is provided in Table L-3. The only mammal observed was the Indian mongoose (*Herpestes auropunctatus*), a common invasive species on Vieques. No snakes or amphibians were observed. A total of 27 species of birds have been observed by GMI (Geo-Marine, 2007), or by CH2M HILL during the RI sampling event. Many birds were observed foraging in the ECA Lagoon, the most common of which included white-cheeked pintail (*Anas bahamensis*), ruddy turnstone (*Arenaria interpres*), greater yellowlegs (*Tringa melanoleuca*), and blue-winged teal (*Anas discors*).

The qualitative survey of the aquatic habitats in the ECA Lagoon identified few species. The most abundant was the saltpan fiddler crab (*Uca burgersi*) which was commonly associated with the large patches of widgeon grass, including areas well out in the open water. Several damselfly nymphs were found in the widgeon grass. The species could not be identified, but apparently is one that is tolerant of brackish water conditions. No fish were captured, nor were any seen moving in the shallow water during several days of surveying. Considering the fish sampling effort involved using small dip nets around various aquatic structures and open water, it is possible that small fish occur in the lagoon. Land crab (*Cardisoma guanhumi*) burrows occur along the eastern side of the lagoon. Land crab burrows were also found in a low area near the southern coastline at the southwestern corner of the ECA.

1.2.1.4 Rare, Threatened, and Endangered Species

Thirteen federally listed species are known to occur, or have the potential to occur, on or near NASD Vieques (Table L-4). No listed plant species were identified at the ECA (Geo-Marine, 2007).

A turtle nesting beach occurs along the north side of the ECA along Playa Blanca (Geo-Marine, 2007). Species confirmed having nested along the Playa Blanca beach include the green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) sea turtles.

No roseate terns (threatened) were observed, however, GMI noted they can occur in the area from May through October, and are known to have historically occurred and/or nested on the ECA beaches. This species typically forages for fish along coastlines and in estuaries, and would not be expected to forage within the ECA Lagoon because of its inland location. The apparent lack or scarcity of fish in the lagoon, based upon the results of the qualitative fish survey described in Section 1.2.1.1, would also preclude foraging activities by this species.

The white-cheeked pintail is not federally listed, but is considered rare in Puerto Rico. Approximately 60 white-cheeked pintails were frequently observed foraging in the widgeon grass throughout the ECA Lagoon during the RI sampling event.

Although several distinct and productive habitats occur in the ECA, no areas of designated critical habitat were observed.

1.2.2 Summary of Available Analytical Data

ECA samples evaluated in the ECA ERA are listed in Table L-5, and their locations are shown on Figure L-1. The analytical data sets for these samples are included in Appendix J, including ECA Lagoon surface water (discrete), ECA Lagoon sediment (discrete), SMI (composite incremental) surface soil, lagoon fringe decision unit deeper surface soil (discrete), beach decision unit deeper surface soil (discrete), and upland decision unit deeper surface soil (discrete). Background (incremental) ECA soil samples are also included in Table L-5. The incremental background value technical memorandum is included as Appendix M.

The ECA Lagoon is represented by samples collected from 5 marine surface water and 15 marine sediment stations. SMI soil sampling (0 – 2 inches) was conducted at 4 terrestrial decision units for a total of 27 samples. At the lagoon fringe decision unit, discrete deeper surface soil samples (2 - up to 24 inches) were collected from 5 stations. At the beach decision unit, discrete deeper surface soil samples (18 – 24 inches) were collected from 2 stations. At the upland decision unit, one discrete deeper surface soil sample (2 – 18 inches) was collected from 1 station to evaluate potential exposures for the land crab, based upon the identification of land crab activity in this area. Physical parameter measurements are presented in Tables L-1 (surface water), L-2 (sediment), and L-6 (soil).

1.2.3 Conceptual Site Model

The conceptual site model relates potentially exposed receptor populations with potential source areas based upon physical site characteristics and complete exposure pathways. Important components of the conceptual site model are the identification of potential source areas, transport pathways, exposure media, exposure pathways and routes, and receptors. Actual or potential exposures of ecological receptors associated with a site are determined by identifying the most likely, and most important, mechanisms and pathways of contaminant release and transport. A complete exposure pathway has three components: (1) a source of chemicals that results in a release to the environment; (2) a pathway of chemical transport through an environmental medium; and (3) an exposure or contact point for an ecological receptor. Figure L-2 illustrates a diagrammatic conceptual site model for the ECA. Key components of this conceptual site model are discussed in the following subsections.

1.2.3.1 Potential Source Areas

Potential source areas in the ECA include:

- Deterioration of MEC and related scrap metal (i.e., point source releases).
- Historical detonations (dispersion of explosive contamination [i.e., non-point source releases]). However, data collected to date on Vieques (e.g., SWMU 4, soil samples within ECA, and air monitoring stations during and after controlled detonations) indicate this mechanism of release is not likely to be significant.
- Former battery pile associated with the lighthouse on the eastern end of the ECA.

1.2.3.2 Transport Pathways and Exposure Media

A transport pathway describes the mechanisms whereby site-related chemicals, once released, may be transported from a source to ecologically relevant media (such as surface water) where exposures may occur. These transport pathways are shown on Figure L-2 and include:

- Overland flow (runoff) that redistributes surface soil contaminants within terrestrial habitats or transports them to low-lying areas (e.g., the ECA Lagoon).
- Storm surges, tides, and waves may distribute contaminants associated with soils in low lying areas, primarily the beaches. In this storm surge scenario, contaminant migration from the ECA Lagoon flushing onto the beach is unlikely due to the large strip of vegetated land between the lagoon and beach.

Based upon the information described in the following documents, leaching of site-related contaminants to groundwater at the ECA is not a concern:

- The Eastern Conservation Area (ECA) Remedial Investigation (RI) Sampling and Analysis Plan (SAP) (CH2M HILL, 2011a).
- Technical Memorandum, Rationale for Not Needing Groundwater Data at the Eastern Conservation Area (CH2M HILL, 2011b).

The ECA SAP indicates that percolating rainwater infiltrates downwards within the Karst terrain and fractures of the limestone and dolomite. Limestone typically does not have impermeable surfaces to cause perched groundwater conditions, especially under Karst conditions. Groundwater within the ECA likely occurs within the limestone and dolomite bedrock and the water table is likely encountered near sea level and is tidally influenced. Groundwater seeps were not observed along the cliff faces, which is consistent with what would be expected in a Karst terrain. Groundwater discharge is to the ocean and is not believed to perennially discharge to the ECA Lagoon since the lagoon is periodically dry.

The Technical Memorandum provides an evaluation of potential contaminant leaching into groundwater at the ECA. Among the 50 soil samples collected, there were only a few detections (four metals and one explosive) above site-specific soil screening levels (SSLs). Though the water beneath the ECA is very likely saline and therefore non-potable, as a conservative measure, SSLs were evaluated to provide supporting rationale for not needing groundwater data at the ECA. One explosive in surface soil exceeded its SSL, yet no explosives were detected in

subsurface soil, or in surface water or sediment in the ECA Lagoon. The vast majority of SSL exceedances were for arsenic. However, arsenic is not a site-related contaminant because it is not associated with munitions. Hexavalent chromium was detected in three discrete soil samples above its SSL. Although there is no background hexavalent chromium value available for discrete samples, none of the total chromium concentrations detected in the ECA surface or subsurface soil samples exceeded the background total chromium concentrations. In addition, based upon the average percent hexavalent chromium in the ECA soil samples, all detected hexavalent chromium concentrations in ECA soil are approximately an order of magnitude below the calculated background hexavalent chromium concentrations. Therefore, it is very likely that the few hexavalent chromium detections are at background levels. The one iron detection and the three cobalt detections were determined to be likely attributable to background. Though the remaining detection of cobalt in a lowland subsurface sample may be site related, further evaluation of surface water and sediment in the downgradient ECA Lagoon indicates the cobalt concentrations in the lagoon are not likely associated with contamination. Based upon this information, leaching of contaminants to groundwater at the ECA is not a concern. Therefore, groundwater data are not needed in order to make site-specific assessments and decisions. Thus, the potential transport pathway of constituents at the ground surface leaching into groundwater and migrating to the ECA Lagoon or surrounding ocean (including Bahia Playa Blanca) is incomplete. As a result, this pathway was not included in the conceptual site model.

Exposure media for ecological receptors at the ECA include:

- Surface water: in the ECA Lagoon, sampled at mid-depth.
- Surface sediment: in the ECA Lagoon, 0 - 6 inches.
- Surface soil: 0 - 2 inches across the terrestrial habitats of the ECA (Decision Units 1-4, composite incremental soil samples).
- Deeper surface soil: 2 inches - up to 24 inches within habitat suitable for land crabs around the perimeter (fringe) of the lagoon (Decision Unit 3 discrete soil samples) and in the southwestern corner of the ECA (Decision Unit 4 discrete soil samples).
- Deeper surface soil: 18 - 24 inches in the turtle nesting beach area, within the landward zone containing suitable nesting habitat (Decision Unit 1 discrete soil samples). This depth interval is the zone where hawksbill and green sea turtles lay their eggs.

Air is not addressed in this ERA since this medium is not likely to result in significant contributions to total exposures.

1.2.3.3 Exposure Pathways and Routes

An exposure pathway links a source of contamination with one or more receptors through exposure via one or more media and exposure routes. Exposure, and thus potential risk, can only occur if complete exposure pathways exist. Figure L-2 shows the potentially complete exposure pathways to ecological receptors at the ECA.

Potentially complete exposure pathways exist for aquatic receptors exposed to surface water and sediment in the ECA Lagoon. Receptor groups evaluated in this ERA include fish, aquatic invertebrates, aquatic plants, birds, and mammals.

Potentially complete exposure pathways exist for terrestrial receptors exposed to surface soil across the ECA. Receptor groups evaluated in this ERA include terrestrial plants, soil invertebrates, reptiles, birds, and mammals.

Potentially complete exposure pathways exist for terrestrial receptors exposed to deeper surface soil, as follows:

- Land crabs exposed to deeper (2 – up to 24 inches) surface soil within the ECA Lagoon fringe, and at the southwestern corner of the ECA near the coastline.
- Sea turtle eggs exposed to deeper (18 - 24 inches) soil along the Playa Blanca beach.

An exposure route describes the specific mechanism(s) by which a receptor is exposed to a chemical present in an environmental medium. The most common exposure routes are dermal contact, direct uptake, ingestion, and

inhalation. Terrestrial plants may be exposed to chemicals present in surface soils through their root surfaces during water and nutrient uptake. Unrooted, floating aquatic plants, rooted submerged vascular aquatic plants, and algae may be exposed to chemicals directly from the water or (for rooted plants) from sediment. Terrestrial and aquatic invertebrates may be exposed to chemicals in surface soil, surface sediment, and/or surface water through dermal contact and ingestion.

Animals may be exposed to chemicals through the: (1) inhalation of gaseous chemicals or of chemicals adhered to airborne particulate matter; (2) incidental ingestion of contaminated abiotic media (soil and/or sediment) during feeding or preening activities; (3) ingestion of contaminated water; (4) ingestion of contaminated plant and/or animal tissues for chemicals that have entered food webs; and/or (5) dermal contact with contaminated abiotic media. These routes, where applicable, are depicted on Figure L-2.

Direct contact is the primary exposure route for lower trophic level receptors (e.g., plants; aquatic and soil invertebrates) at the site. Incidental ingestion of sediment and exposure via aquatic food webs are the primary exposure routes for upper trophic level receptors (e.g., wading birds) in the lagoon. Incidental ingestion of soil and exposure via terrestrial food webs are the primary exposure routes for upper trophic level receptors (e.g., omnivorous birds) in the terrestrial habitats of the ECA. The following pathways are not evaluated for wildlife receptors in the ERA:

- The contribution to the total dose from the inhalation route is generally insignificant for upper trophic level ecological receptors relative to ingestion pathways. Thus, the air (inhalation) pathway was not evaluated for ecological receptors.
- Direct ingestion of drinking water is only considered when a permanent or semi-permanent source of water with a salinity below 15 parts per thousand (ppt), the approximate toxic threshold for wildlife receptors (Humphreys, 1988), exists on a site. Based upon available data (Table L-1), the average salinity in the ECA Lagoon has ranged from 20.7 to 77.6 ppt, which is above this threshold. Thus, exposure via direct ingestion of drinking water was not included in the ERA.
- Exposure to chemicals present in surface soil and surface sediment via dermal contact may occur but is unlikely to represent a major exposure pathway for most upper trophic level receptors because fur or feathers minimize transfer of chemicals across dermal tissue. Thus, dermal contact was not evaluated for upper trophic level receptors in the ERA. Incidental ingestion of surface soil or surface sediment during feeding, preening, or grooming activities was, however, considered in the risk estimates. Direct contact was considered for lower trophic level receptors (soil and benthic invertebrates).

1.2.3.4 Receptors

Because of the complexity of natural systems, it is generally not possible to directly assess the potential impacts to all ecological receptors present at a site. Therefore, specific receptor species (e.g., green heron) or species groups (e.g., fish) are often selected as surrogates to evaluate potential risks to larger components of the ecological community (guilds; such as piscivorous birds) used to represent the assessment endpoints (e.g., survival and reproduction of piscivorous birds). Selection criteria typically include those species that:

- Are known to occur, or are likely to occur, at the site.
- Have a particular ecological, economic, or aesthetic value.
- Are representative of taxonomic groups, life history traits, and/or trophic levels in the habitats present for which complete exposure pathways are likely to exist.
- Can, because of toxicological sensitivity or potential exposure magnitude, be expected to represent potentially sensitive populations.

Upper trophic level receptors quantitatively evaluated in the ERA were limited to birds and mammals, the taxonomic groups with the most available information regarding exposure and toxicological effects. The following

upper trophic level receptors were selected for exposure modeling in terrestrial habitats based upon the criteria listed above and the habitats present on the site:

- Norway rat (*Rattus norvegicus*) – terrestrial mammalian omnivore (modeled as an herbivore in the SERA portion of the ERA).
- Indian mongoose (*Herpestes auropunctatus*) – terrestrial mammalian omnivore (modeled as an invertivore in the SERA portion of the ERA).
- Velvet free-tailed bat (*Molossus molossus*) – aerial mammalian insectivore.
- Fruit bat (*Artibeus jamaicensis*) – terrestrial mammalian herbivore.
- Pearly-eyed thrasher (*Margarops fuscatus*) – terrestrial avian omnivore (modeled as an invertivore in the SERA portion of the ERA).
- Red-tailed hawk (*Buteo jamaicensis*) – terrestrial avian carnivore.
- Cave swallow (*Petrochelidon fulva*) – aerial avian insectivore.
- Common ground dove (*Columbina passerine*) – terrestrial avian herbivore.

The following upper trophic level receptors were selected for exposure modeling in aquatic and wetland habitats of the lagoon based upon the criteria listed above:

- Green heron (*Butorides virescens*) – aquatic avian invertivore/piscivore (modeled as a piscivore in the SERA portion of the ERA).
- Spotted sandpiper (*Actitis macularia*) – aquatic avian invertivore.
- Cave swallow (*Petrochelidon fulva*) – aerial avian insectivore.
- White-cheeked pintail (*Anas discors*) – aquatic avian omnivore (modeled as a herbivore in the SERA portion of the ERA).
- Fishing bat (*Noctilio leporinus*) – mammalian piscivore.
- Velvet free-tailed bat (*Molossus molossus*) – aerial mammalian insectivore.

There is a high degree of uncertainty regarding the estimation of bioaccumulated chemicals in aerial insects that are consumed by insectivorous bats (free-tailed bat) and birds (cave swallow) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates. This is also true for estimating chemical concentrations in non-vegetative parts of plants, such as fruit or nectar, consumed by some receptors (fruit bat). These uncertainties are discussed in the uncertainty section (Section 1.6).

The rat and mongoose were included as receptors to represent specific receptor guilds, recognizing that should unacceptable risks be found for these receptors, risk managers will consider their status as invasive species. Although direct impacts to these invasive species themselves may not be considered significant from a risk management perspective, the reduction of their populations may have indirect adverse impacts to native species, such as the red-tailed hawk, that may prey upon these species.

Lower trophic level receptor species were evaluated based upon those taxonomic groupings for which medium-specific ecological screening values (ESVs) have been developed. As such, specific species of aquatic biota (plants, fish, and benthic invertebrates) were not chosen as receptors because of the limited information available for specific species and because aquatic biota were evaluated on a community level via a comparison of surface water and sediment concentrations with medium-specific ESVs. Similarly, specific species of terrestrial biota (plants and soil invertebrates) were not chosen as receptors because of the limited information available for specific species and because these receptors are evaluated on a community level via a comparison to soil ESVs developed for these groups. Deeper surface soil collected from land crab habitat (depths of 2 – up to 24 inches) were evaluated against soil screening values for soil invertebrates.

Reptiles are also an applicable receptor group. However, individual species of reptiles were not selected for evaluation because of the very limited amount of available toxicological information for this taxonomic group for direct effects and effects from exposures via food webs. Potential risks to reptiles from food web exposures were evaluated using other terrestrial fauna (birds and mammals) as surrogates. Similarly, potential risks to reptiles (e.g., snakes) from direct exposures to surface soil were evaluated using soil ESVs developed for other taxonomic groups (described above). The evaluation of deeper surface soil collected from potential turtle nesting habitat (depths of 18 – 24 inches) for the protection of turtle eggs also utilized the soil ESVs described in the final ERA protocol, which are based upon effects to terrestrial plants and soil invertebrates[2]. The uncertainties associated with this extrapolation are discussed in the uncertainty section (Section 1.6).

1.2.3.5 Endpoints and Risk Hypotheses

The conclusion of the problem formulation includes the selection of ecological endpoints and risk hypotheses, which are based upon the conceptual model. Two types of endpoints, assessment endpoints and measurement endpoints, are defined as part of the ERA process (USEPA, 1997a). An assessment endpoint is an explicit expression of the environmental component or value that is to be protected. A measurement endpoint is a measurable ecological characteristic that is related to the component or value chosen as the assessment endpoint. The considerations for selecting assessment and measurement endpoints are summarized in USEPA (1997a) and discussed in detail in Suter (1989, 1990, 1993). Risk hypotheses are testable hypotheses about the relationship among the assessment endpoints and their predicted responses when exposed to contaminants.

Endpoints define ecological attributes that are to be protected (assessment endpoints) and measurable characteristics of those attributes (measurement endpoints) that can be used to gauge the degree of impact that has or may occur. Assessment endpoints most often relate to attributes of biological populations or communities, and are intended to focus the risk assessment on particular components of the ecosystem that could be adversely affected by chemicals attributable to a site (USEPA, 1997a). Assessment endpoints contain an entity (e.g., heron population) and an attribute of that entity (e.g., survival rate). Individual assessment endpoints usually encompass a group of species or populations (the receptor) with some common characteristic, such as specific exposure route or contaminant sensitivity, with the receptor then used to represent the assessment endpoint in the risk evaluation.

Assessment and measurement endpoints may involve ecological components from any level of biological organization, from individual organisms to the ecosystem itself. Effects on individual organisms are important for some receptors, such as rare and endangered species; population- and community-level effects are typically more relevant to ecosystems. Population- and community-level effects are usually difficult to evaluate directly without long-term and extensive study. However, measurement endpoint evaluations at the individual level, such as an evaluation of the effects of chemical exposure on reproduction, can be used to predict effects on an assessment endpoint at the population or community level. In addition, use of criteria values designed to protect the majority of the components of a community (e.g., Ambient Water Quality Criteria [AWQC] for the Protection of Aquatic Life) can be useful in evaluating potential community- and/or population-level effects.

Table L-7 shows the assessment endpoints, risk hypotheses, and measurement endpoints used in the ERA. Table L-7 also shows the receptors associated with each endpoint.

1.3 Exposure Assessment

The principal activity associated with the exposure assessment is the estimation of chemical concentrations in applicable media, termed exposure point concentrations (EPCs), to which the receptors may be exposed. This is accomplished through the selection of appropriate sets of the available analytical data using a set of criteria (e.g., validation status, sampling date). Once the analytical data sets are selected, EPCs are calculated as a particular point on the distribution of concentrations. At the screening level (Step 2), the EPC is the maximum detected concentration. At the baseline level (Step 3A), EPCs are central tendency estimates (e.g., arithmetic mean). EPCs are then used in bioaccumulation and food web models to estimate exposures to upper trophic level receptors.

[2] Bird and/or mammal Eco-SSLs were not used because these values are based upon exposures via food webs and not from direct contact (while the plant and invertebrate values are based upon direct contact). Direct contact is the only relevant exposure pathway for turtle eggs.

For conservatism, the maximum (SERA) and mean (BERA) reporting limits for chemicals analyzed for but not detected were also compared to medium-specific ESVs and (where applicable) used for food web exposure modeling. This was done to determine if reporting limits were less than chemical concentrations at which potential adverse effects to ecological receptors may occur.

1.3.1 Selection Criteria for Analytical Data

Available analytical data (described in Section 1.2.2) were selected for use in the ERA based upon the following:

- Data must have been validated by a qualified data validator using acceptable data validation methods. Rejected (R) values were not used in the ERA. Unqualified data and data qualified as J (estimated), L (biased low), or K (biased high) were treated as detected. Data qualified as U (undetected) or B (blank contamination) were treated as non-detected.
- For samples with duplicate analyses, the higher of the two concentrations was used when both values were detects or when both values were non-detects. In cases where one result was a detect and the other a non-detect, the detected value was used in the assessment.
- For non-detected results, the sample quantitation (reporting) limit (SQL) was used to represent the concentration. When calculating statistics (e.g., arithmetic mean), one-half of the SQL was used for non-detected results.

1.3.2 Data Groupings

Surface soil, surface water, and surface sediment data were partitioned into the following spatial groups:

- **Site Surface Soil (SMI)** – soil samples collected from 0 - 2 inches across the terrestrial habitats of the ECA (Decision Units 1-4, composite incremental soil samples).
- **Lagoon Fringe Deeper Surface Soil** – soil samples collected from 2 – up to 24 inches within habitat suitable for land crabs around the perimeter (fringe) of the lagoon (Decision Unit 3 discrete soil samples).
- **Beach Deeper Surface Soil** – soil samples collected from 18 – 24 inches in the turtle nesting beach area, within the landward zone containing suitable nesting habitat (Decision Unit 1 discrete soil samples).
- **Upland Deeper Surface Soil** – a single soil sample collected from 2 – 18 inches at a land crab burrow location within the southwestern corner of the ECA (Decision Unit 4 discrete soil sample).
- **Surface Water (lagoon)** – all surface water samples collected from the ECA Lagoon (mid-depth).
- **Surface Sediment (lagoon)** – all sediment samples collected from the ECA Lagoon from a depth of 0 - 6 inches.

In addition, composite incremental background soil samples collected from 0 - 2 inches were used to represent background (through the calculation of 95% UTLs) for comparison with the SMI samples (see Appendix M). Background UTLs from the East Vieques background study (CH2M HILL, 2007) were used for comparison to the discrete soil samples collected from the lagoon fringe and beach.

1.3.3 Exposure Point Concentrations

At the screening level (SERA; Step 2) for direct exposures, the EPC was the maximum detected concentration. At the baseline level (BERA; Step 3A) for direct exposures, the EPC was a central tendency estimate (arithmetic mean and the 95 percent upper confidence limit [UCL] of the arithmetic mean), which provides a more representative estimate of potential exposures and risks to receptor populations (which are the focus of the selected assessment endpoints). These three EPCs were also used in bioaccumulation and food web models to estimate exposures to upper trophic level receptors. Dietary items for which tissue concentrations were modeled included terrestrial and aquatic plants, benthic invertebrates, soil invertebrates, small mammals, and fish.

Incidental ingestion of surface soil and surface sediment, but not ingestion of drinking water (due to the high salinity of the lagoon), was included when calculating the total exposure. The models and parameter values used for calculating these tissue concentrations are outlined in the following subsections.

Not all chemicals were evaluated for food web exposures. Only those chemicals with the potential to bioaccumulate to a significant extent, as defined in Table 4-2 of USEPA (2000), were evaluated. This list of bioaccumulating chemicals is provided in Table L-8 for chemicals relevant to the ECA, and is based upon the list and selection process outlined in the final ERA Protocol (CH2M HILL, 2010a). The list of relevant chemicals for the ECA includes: (1) all sampled chemicals on the USEPA (2000) list; (2) all explosive compounds detected in ECA SMI surface soil (1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, HMX, nitrobenzene, and perchlorate); no explosives were detected in lagoon surface water and sediment, or in discrete soil samples from the lagoon fringe or beach; and (3) chemicals not on the list of important bioaccumulative chemicals (USEPA, 2000) for which bird and/or mammal Eco-SSLs have been developed (evaluated for terrestrial food web exposures only).

For the screening (SERA) exposure estimates, the uptake of chemicals from the abiotic media into food items was based upon conservative (e.g., 90th percentile) bioconcentration factors (BCFs) or bioaccumulation factors (BAFs) from the literature, where available. The 90th percentile is generally recommended to provide for a conservative screening assessment (Sample et al., 1998a; 1998b; Bechtel Jacobs, 1998b). If 90th percentile values were not available in the cited reference, the maximum value was used, if available. If only central tendency (e.g., median) values were reported, they were used for both the SERA and BERA. Where an individual study (as opposed to a compilation of multiple studies) was cited, the best available value was sometimes a single value or the derivation was not specified. Default (assumed) factors of 1.0 were used only when data were not readily available for a chemical in the literature.

BCFs and BAFs used for baseline (BERA) exposure estimates were based upon, or modeled from, central tendency estimates (e.g., median or mean). Baseline values considered both the distribution of the data (e.g., normal or log normal) and the recommendations in the cited reference. Geometric means were preferred for log normal distributions and arithmetic means for normal distributions. In some cases, neither distribution was applicable or the distribution was biased by an outlying value. In these cases, point estimates like the median were then considered. Where an individual study (as opposed to a compilation of multiple studies) was cited, the best available value was sometimes a single value or the derivation was not specified. Default (assumed) factors of 1.0 were used only when data were not readily available for a chemical in the literature.

In the baseline assessment, using central tendency estimates (rather than high-end values or maximums) for exposure parameters such as BAFs provides a more representative estimate of potential exposures and risks to receptor populations (which are the focus of the selected assessment endpoints) of upper trophic level receptors. Since these upper trophic level species are highly mobile, they would be expected to effectively average their exposure over time as they forage within the area defining their home range. Average prey concentrations are most appropriately estimated using central tendency estimates of media concentrations and accumulation factors. For example, the wildlife dietary exposure models contained in the *Wildlife Exposure Factors Handbook* (USEPA, 1993) specify the calculation of an average daily dose. Increasing the representativeness of the exposure estimates relative to population-level effects is consistent with the intent of the BERA. In cases where adequate spatial sampling coverage exists, mean concentrations are also appropriate for evaluating potential risks to populations of lower trophic level receptors because the members of the population are expected to be found throughout a site (where suitable habitat is present), rather than concentrated in one particular area. While effects on individual organisms might be important for some receptors, such as rare and endangered species, population- and community-level effects are typically more relevant to ecosystems.

1.3.3.1 Terrestrial Plants

Tissue concentrations in the above-ground vegetative portion of terrestrial plants were estimated by multiplying the maximum (SERA) or mean (BERA) surface soil concentration for each bioaccumulative chemical by chemical-specific soil-to-plant BAFs obtained from the literature. These BAFs, for both the SERA and BERA, are listed in Table L-9. For the SERA (Step 2), the point estimate BAFs in Table L-9 (screening set) were the preferred values. For the BERA (Step 3A), the algorithms listed in Table L-10, if available for a chemical, were the preferred method for deriving BAFs, followed by the point-estimate BAFs in Table L-9 (baseline set).

The BAF values used were based upon root uptake from soil and upon the ratio between dry-weight soil and dry-weight plant tissue. Literature values based upon the ratio between dry-weight soil and wet-weight plant tissue were converted to a dry-weight basis by dividing the wet-weight BAF by an estimated solids content for terrestrial plants (15 percent [0.15]; Sample et al., 1997).

For inorganic chemicals lacking literature-based, chemical-specific BAFs or applicable algorithms, a soil-to-plant BAF of 1.0 was used. For non-ionic organic chemicals (with a log K_{ow} of between 3 and 8) without literature-based BAFs, soil-to-plant BAFs were estimated using the rinsed foliage algorithm provided in Figure 5B of USEPA (2007f):

$$\log BAF = (-0.4057)(\log K_{ow}) + 1.781$$

where: BAF = Soil-to-plant BAF (unitless; dry-weight basis)
K_{ow} = Octanol-water partitioning coefficient (unitless)

The log K_{ow} values used in this equation are listed in Table L-8.

1.3.3.2 Soil Invertebrates (Earthworms)

Tissue concentrations in soil invertebrates (earthworms) were estimated by multiplying the maximum (SERA) or mean (BERA) surface soil concentration for each bioaccumulative chemical by chemical-specific soil-to-invertebrate BCFs or BAFs obtained from the literature. These BCF/BAF values, for both the SERA and BERA, are listed in Table L-11. For the SERA, the point estimate BAFs in Table L-11 (screening set) were the preferred values. For the BERA, the algorithms listed in Table L-10, if available for a chemical, were the preferred method for deriving BAFs, followed by the point-estimate BAFs in Table L-11 (baseline set).

BCFs are calculated by dividing the concentration of a chemical in earthworm tissue by the concentration of that same chemical in the surrounding environmental medium (in this case, soil) without accounting for uptake via the diet. BAFs consider both direct exposure to soil and exposure via the diet. Because earthworms consume soil, BAFs are more appropriate values and were used when available. BAFs based upon depurated analyses (soil was purged from the gut of the earthworm prior to analysis) were given preference over undepurated analyses when selecting BAF values because direct ingestion of soil is accounted for separately in the food web model.

The BCF/BAF values selected were based upon the ratio between dry-weight soil and dry-weight earthworm tissue. Literature values based upon the ratio between dry-weight soil and wet-weight earthworm tissue were converted to a dry-weight basis by dividing the wet-weight BCF/BAF by the estimated solids content for earthworms (16 percent [0.16]; USEPA, 1993). For chemicals without available measured BAFs/BCFs, an earthworm BAF was estimated using available regression equations from the literature, was estimated using data for similar chemicals, or a BAF of 1.0 was assumed.

1.3.3.3 Small Mammals

Whole-body tissue concentrations in small mammals (omnivores) were estimated using one of two methodologies. For chemicals with literature-based soil-to-small mammal BAFs, the small mammal tissue concentration was calculated by multiplying the maximum (SERA) or mean (BERA) surface soil concentration for each bioaccumulative chemical by a chemical-specific soil-to-small mammal BAF obtained from the literature. These BAF values, for both the SERA and BERA, are listed in Table L-12. For the SERA, the point estimate BAFs in Table L-12 (screening set) were the preferred values. For the BERA, the algorithms listed in Table L-10, if available for a chemical, were the preferred method for deriving BAFs, followed by the point-estimate BAFs in Table L-12 (baseline set).

The BAF values selected were based upon the ratio between dry-weight soil and whole-body dry-weight tissue. Literature values based upon the ratio between dry-weight soil and wet-weight tissue were converted to a dry-weight basis by dividing the wet-weight BAF by the estimated solids content for small mammals (32 percent [0.32]; USEPA, 1993).

For chemicals without soil-to-small mammal BAF values or algorithms, an alternate approach was used to estimate whole-body tissue concentrations. Because most chemical exposure for these small mammals is via the diet, it was assumed that the concentration of each bioaccumulative chemical in the small mammal's tissues was equal to the

chemical concentration in its diet multiplied by a diet to whole-body BAF derived from the literature. The small mammal tissue concentration was calculated as follows:

$$TC_x = [[\sum_i (FC_{xi})(PDF_i)] + [(SC_x)(PDS)]] (BAF_{diet\text{-}whole\ body})$$

where:

TC_x	=	Small mammal tissue concentration for chemical x (mg/kg, dry weight)
FC_{xi}	=	Concentration of chemical x in food item i (mg/kg, dry weight)
PDF_i	=	Proportion of diet composed of food item i (dry weight basis)
SC_x	=	Concentration of chemical x in soil (mg/kg, dry weight)
PDS	=	Proportion of diet composed of soil (dry weight basis)
BAF	=	Diet to whole-body BAF (unitless)

This equation is basically a weighted average of the chemical concentration in the various dietary components (including soil ingestion) for the small mammal (rat), multiplied by a diet-to-whole body BAF, and thus excludes water ingestion.

For chemicals lacking diet to whole-body BAF values (not to be confused with the soil-to-small mammal BAFs listed in Table L-12), a diet to whole-body BAF of one was assumed. The use of a diet to whole-body BAF of one is likely to result in a conservative estimate of chemical concentrations for chemicals that are not known to biomagnify in terrestrial food webs and a reasonable estimate of chemical concentrations for chemicals that are known to bioaccumulate or biomagnify, based upon reported literature values. For example, a maximum diet to whole-body BAF value of 1.0 was reported by Simmons and McKee (1992) for PCBs based upon laboratory studies with white-footed mice. Menzie et al. (1992) reported diet to whole-body BAF values for DDT of 0.3 for voles and 0.2 for short-tailed shrews. Reported diet to whole-body BAF values for dioxin were only slightly above one (1.4) for the deer mouse (USEPA, 1990).

1.3.3.4 Aquatic Plants

Tissue concentrations in the above-ground vegetative portion of rooted wetland/aquatic plants were estimated by multiplying the surface sediment concentration for each chemical by chemical-specific soil-to-plant BCFs (extrapolated to sediments) obtained from the literature (see Section 1.3.3.1).

The BCF values were based upon root uptake from sediment and upon the ratio between dry-weight sediment and dry-weight plant tissue. Literature values based upon the ratio between dry-weight sediment and wet-weight plant tissue were converted to a dry-weight basis by dividing the wet-weight BCF by the estimated solids content for plants (15 percent [0.15]; Sample et al., 1997).

1.3.3.5 Benthic Invertebrates

Tissue concentrations in benthic invertebrates were estimated by multiplying the maximum (SERA) or mean (BERA) sediment concentration for each chemical by chemical-specific sediment-to-invertebrate BAF or biota-sediment accumulation factor (BSAF) values obtained from the literature. BSAF (wet weight) values were converted to BAF values (dry weight) for use in the food web models using the percent lipid and percent solid values listed in Table L-13, and the mean measured site-specific TOC from the lagoon (1.52 percent). These values, for both the SERA and BERA, are listed in Table L-13. For the SERA, the point estimate BAFs in Table L-13 (screening set) were the preferred values. For the BERA, the algorithms listed in Table L-10, if available for a chemical, were the preferred method for deriving BAFs, followed by the point-estimate BAFs in Table L-13 (baseline set).

The BAF values selected were based upon the ratio between dry-weight sediment and dry-weight invertebrate tissue. BAFs based upon depurated analyses (sediment was purged from the gut of the organism prior to analysis) were given preference over undepurated analyses when selecting BAF values because direct ingestion of sediment is accounted for separately in the food web model. However, in some cases, the depurated data set was limited or highly variable, and the pooled or undepurated data were then considered.

Literature values based upon the ratio between dry-weight sediment and wet-weight invertebrate tissue were converted to a dry-weight basis by dividing the wet-weight BAF by the estimated solids content for benthic invertebrates (21 percent [0.21]; USEPA, 1993). For chemicals without available measured BAFs, a BAF was estimated using available regression equations from the literature, was estimated using data for similar chemicals, or a BAF of 1.0 was assumed.

1.3.3.6 Fish

Tissue concentrations in whole-body fish were estimated by multiplying the maximum (SERA) or mean (BERA) sediment concentration for each chemical by chemical-specific sediment-to-fish BAF or biota-sediment accumulation factor (BSAF) values obtained from the literature. BSAF (wet weight) values were converted to BAF values (dry weight) for use in the food web models using the percent lipid and percent solid values listed in Table L-14, and the mean measured site-specific TOC from the lagoon (1.52 percent). These values, for both the SERA (screening set) and BERA (baseline set), are listed in Table L-14.

The BAF values were based upon the ratio between dry-weight sediment and dry-weight fish tissue. Literature values based upon the ratio between dry-weight sediment and wet-weight fish tissue were converted to a dry-weight basis by dividing the wet-weight BAF by the estimated solids content for fish (25 percent [0.25]; USEPA, 1993). For chemicals without literature-based sediment-to-fish BAFs, a BAF was estimated using data for similar chemicals or a BAF of 1.0 was assumed.

1.3.4 Dietary Intakes

Upper trophic level receptor exposures via food webs to chemicals present in surface soil and surface sediment were determined using estimated chemical concentrations in each relevant dietary component for each upper trophic level receptor, as described in the previous section. Incidental ingestion of surface soil and surface sediment was also included when calculating the total exposure. Drinking water exposures were not included due to the high salinity of the lagoon.

Dietary intakes for each upper trophic level receptor were calculated using the following formula (modified from USEPA [1993]):

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

where:

	DI_x	=	Dietary intake for chemical x (mg chemical/kg body weight/day)
	FIR	=	Food ingestion rate (kg/day, dry-weight)
	FC_{xi}	=	Concentration of chemical x in food item i (mg/kg, dry-weight)
	PDF_i	=	Proportion of diet composed of food item i (dry-weight basis)
	SC_x	=	Concentration of chemical x in soil or sediment (mg/kg, dry-weight)
	PDS	=	Proportion of diet composed of soil or sediment (dry-weight basis)
	BW	=	Body weight (kg, wet-weight)

Incidental ingestion of soil/sediment was modeled as a dietary component rather than using a separate soil/sediment ingestion rate. Parameter values for the selected receptors are listed in Tables L-15 (screening) and L-16 (baseline). When measured food ingestion rates were not available for a receptor from the literature, the rates were estimated using allometric equations from Nagy (2001).

The exposure parameter values were selected to provide for a conservative evaluation at the screening level (Step 2). Examples of these conservative assumptions include:

- All of the dietary items consumed by the receptor are obtained from the site (i.e., an Area Use Factor [AUF] of one was assumed) at the point of maximum concentration.
- Chemicals are 100 percent bioavailable.

- Maximum food ingestion rates were used (calculated maximum ingestion rates using allometric equations were based upon the maximum adult body weight).
- Minimum adult body weights were used. The selection focused on the most geographically appropriate values available from standard literature sources (e.g., USEPA, 1993).
- Exclusive diets (composed of one primary prey item) were used.

For the baseline (Step 3A) estimates:

- Central tendency estimates (e.g., mean, median, or midpoint) for adult body weight and ingestion rates were used, as were more realistic dietary compositions. Central tendency estimates for these exposure parameters are more relevant for a BERA because they better represent the characteristics of a greater proportion of the individuals in the population. Populations or communities (rather than individual organisms) were emphasized when developing the assessment endpoints for the ERA.
- An AUF of 1.0 was retained in Step 3A.

1.4 Effects Assessment

The purpose of the effects assessment is to establish chemical exposure levels (screening values) that represent conservative thresholds for adverse ecological effects. One set of screening values is developed for each selected assessment endpoint. Based upon the conceptual model, direct exposure to surface soil, surface water, and sediment, and exposure via terrestrial and aquatic food webs, are the complete pathways at the site.

The effects assessment defines the methods and data used to define an adverse ecological effect. For this ERA, effects data are available from multiple lines of evidence, as follows:

- **Ecological Screening Values (ESVs) for Surface Water, Sediment, and Surface Soil** - Analytical data are compared to the medium-specific ESVs developed in Section 1.4.1.
- **Toxicity Reference Values (TRVs) for Ingestion Exposures** - Food web exposure estimates are compared to ingestion-based TRVs developed in Section 1.4.2 for upper trophic level receptors.
- **Bioavailability Measures** - Additional data were collected to help evaluate chemical-specific bioavailability in surface soil, surface water, and sediment.

In addition, comparison of site surface soil concentrations to Vieques-wide background concentrations (discrete samples) and ECA-specific background concentrations (SMI composite samples) was conducted as an additional line of evidence (see Section 1.5).

1.4.1 Medium-Specific ESVs

Medium-specific ESVs were established for each ecologically relevant medium. Based upon the conceptual site model (Figure L-2), direct exposure to surface water, surface sediment, and surface soil are potentially complete pathways. Based upon the salinity of the lagoon, marine ESVs were used, when available; freshwater values were considered when marine values were lacking. The ESVs used in the ERA are summarized, by medium, in Tables L-17 through L-19.

For surface water, the ESVs for chemicals known to bioaccumulate in aquatic food webs were based upon the final chronic value (rather than the final residue value) as per USEPA (1996a, 2009) and Suter and Tsao (1996). The use of final chronic values is intended to protect aquatic receptors from direct exposures to chemicals in surface water, rather than from exposure via food webs. Potential risks to upper trophic level receptors from food web exposures (tissue residues) were evaluated separately using the ingestion-based TRVs outlined in Section 1.4.2.

Measures of chemical bioavailability are also included in this assessment. For surface water, USEPA (1996a) indicates that the dissolved metal fraction should be preferentially used compared to the total metal fraction in surface water evaluations because dissolved metal concentrations best represent the bioavailable fraction. High

levels of suspended solids and sediment-adsorbed metals, which could be present in unfiltered samples, could result in overstating bioavailable surface water concentrations and thus potential exposures and risks.

1.4.2 Ingestion TRVs

Ingestion TRVs for dietary exposures were derived for each bioaccumulative chemical evaluated in the ERA. TRVs were derived for both mammalian and avian upper trophic level receptors, the only two taxonomic groups for which sufficient toxicological information was generally available for the range of bioaccumulative chemicals evaluated. Toxicological information from the literature for wildlife species most closely related to the receptor species were used, where available, but were supplemented by laboratory studies of non-wildlife species (e.g., laboratory mice) where necessary. The ingestion TRVs are expressed as milligrams of the chemical per kilogram body weight of the receptor per day (mg/kg-BW/day).

Survival, growth, and reproduction were emphasized as toxicological endpoints because they are the most relevant, ecologically, to maintaining viable populations and because they are generally the most studied toxicological endpoints for ecological receptors. Endpoints based upon reproduction were generally preferred to those based upon growth which were preferred to those based upon survival. If several chronic toxicological studies were available from the literature, the most appropriate study was selected for each receptor species based upon study design, study methodology, study duration, study endpoint, and test species.

Ingestion TRVs were derived for both chronic No Observed Adverse Effect Level (NOAEL) and chronic Lowest Observed Effect Level (LOAEL) endpoints. The applicable uncertainty factors from Table L-20 were used to derive these TRVs where appropriate (uncertainty factors were not generally applied to TRVs obtained from Eco-SSL documents because these TRVs often encompassed multiple studies). Because assessment endpoints were based upon population- or community-level effects, no intraspecies uncertainty factors were applied. Taxonomic class-type uncertainty factors were also not applied because the TRVs selected were typically derived based upon data from a broad range of taxonomic groups. Maximum Acceptable Toxicant Concentrations (MATCs), defined as the geometric mean of the NOAEL and LOAEL, were also calculated.

In terrestrial habitats, Step 2 food web COPCs were selected by first comparing maximum soil concentrations with the lower of the available bird and mammal Eco-SSLs (Table L-21). Chemicals that exceeded the Eco-SSLs based upon the maximum soil concentration were retained for site-specific food web modeling. Those that did not were not evaluated further for terrestrial food web exposures. The final Step 2 food web COPCs were selected based upon a comparison of maximum exposure doses from site-specific food web modeling with the NOAEL-based ingestion TRV. Those chemicals with an exposure dose exceeding the NOAEL-based ingestion TRV were identified as Step 2 COPCs. For Step 3A, ingestion-based (food web) COPCs were based upon a comparison of mean exposure doses with ingestion TRVs based upon the NOAEL, MATC, and LOAEL. An exceedance of the MATC was considered an unacceptable effect at Step 3A, although chemicals that exceed the MATC, but not the LOAEL, were discussed for possible risk management considerations.

Ingestion TRVs for mammals and birds are provided in Tables L-22 and L-23, respectively. Where more than one value is shown for a chemical in these tables, the value used for each receptor is specified in Attachments L-1 and L-2.

1.4.3 Bioavailability Measures

Data collected to evaluate the potential chemical-specific bioavailability in abiotic media included:

- Surface Soil – pH.
- Sediment – TOC, pH, and grain size.
- Surface Water – Dissolved metals.

1.5 Risk Characterization

The risk characterization portion of the ERA uses the information generated during the three previous parts of the ERA (problem formulation, exposure assessment, and effects assessment) to estimate potential risks to ecological receptors at the level of conservatism applied (screening or baseline).

1.5.1 Methodology

The methodology used for the risk characterization, per the final ERA protocol, is described in the following two subsections for the SERA (Step 2) and BERA (Step 3A).

1.5.1.1 SERA Approach

The main objective of risk characterization at the screening level (termed risk calculation) is to derive a list of COPCs. As part of this risk calculation, the maximum exposure concentrations (abiotic media) or maximum exposure doses (upper trophic level receptors) are compared with the corresponding ESVs or TRVs to derive risk estimates using the hazard quotient (HQ) method. HQs are calculated by dividing the chemical concentration in the medium being evaluated by the corresponding medium-specific ESV, or by dividing the exposure dose by the corresponding ingestion-based TRV. HQs equaling or exceeding one indicate the potential for unacceptable risk since the chemical concentration or dose (exposure) equals or exceeds the ESV or TRV (effect); these chemicals are identified as COPCs at Step 2. However, ESVs/TRVs and exposure estimates are derived using intentionally conservative assumptions at the screening level such that HQs greater than or equal to one do not necessarily indicate that unacceptable risks are present. Rather, it identifies chemical-pathway-receptor combinations requiring further evaluation using more realistic exposure scenarios and assumptions. Following the same reasoning, HQs less than one indicate that unacceptable risks are unlikely, enabling a conclusion of negligible (acceptable) risk to be reached with high confidence.

In addition to chemicals that exceeded medium-specific ESVs based upon maximum detected concentrations, or that exceeded TRVs based upon maximum ingestion doses, the following also applied to COPC selection at Step 2:

- Non-detected chemicals were retained as COPCs if the maximum detection limit exceeded the ESV for that medium or if the ingestion dose calculated using the maximum detection limit exceeded the TRV.
- All detected chemicals lacking a TRV and/or ESV were retained as COPCs.
- The essential nutrients calcium, magnesium, potassium, and sodium were excluded as potential COPCs since they are essential macronutrients that are needed in relatively high concentrations for normal metabolism, growth, and reproduction.

1.5.1.2 BERA Approach

COPCs from the SERA are reevaluated in the first step of the BERA (Step 3A). As discussed previously, this reevaluation involves using more realistic assumptions about exposures and a comparison of these revised exposure estimates (based upon central tendency estimates of media concentrations, BAFs, and exposure parameters) with ESVs and TRVs.

In addition to chemicals that exceeded medium-specific ESVs based upon mean detected concentrations, or that exceeded TRVs based upon mean ingestion doses, the following also applied to COPC selection at Step 3A:

- All detected chemicals lacking a TRV and/or ESV were retained as COPCs for risk evaluation.
- Ingestion-based (food web) COPCs were based upon a comparison of mean and 95% UCL exposure doses with ingestion TRVs based upon the NOAEL, MATC, and LOAEL. An exceedance of the MATC was generally considered an unacceptable effect at Step 3A, although chemicals that exceed the MATC, but not the LOAEL, were discussed for possible risk management considerations.

For Step 3A, the following additional factors were also considered, as appropriate:

- **Frequency of Detection.** Chemicals that were detected in less than five percent of the samples in a medium were generally eliminated as COPCs in that medium if at least 20 samples are available (USEPA, 1989). It is

unlikely that infrequently detected chemicals represent an unacceptable risk to receptors at the population level, due to limited spatial exposure. However, a qualitative evaluation was conducted to insure that "hot spot" areas were not eliminated from consideration based upon this screening criterion before a chemical was eliminated from further consideration.

- **Vieques-Wide Background Concentrations.** Vieques-wide background concentrations from the East Vieques background study (CH2M HILL, 2007) were also considered in the reevaluation for surface soil (discrete samples from the lagoon fringe and beach). The background evaluation consisted of a direct comparison of site surface soil concentrations to the upper tolerance limits (UTLs) developed for inorganics in the background study (Table L-24), in a manner analogous to the comparison to ESVs. The ECA falls within soil type Tl so UTLs based upon this soil type were used in the ERA.
- In addition, composite incremental background soil samples collected from 0 - 2 inches were used to represent background (through the calculation of 95 percent UTLs; see Appendix M) for comparison with the SMI samples collected from the site. These incremental UTLs are also listed in Table L-24.

1.5.2 Terrestrial Habitats – ECA SMI Surface Soil

This spatial area includes Decision Units 1-4. SMI surface soil samples are compared with soil ESVs and used to calculate food web exposures.

1.5.2.1 Comparison with Soil ESVs

Maximum, mean, and 95% UCL SMI surface soil concentrations are compared to soil ESVs for plants and soil invertebrates in Table L-25. Table L-25 also contains a comparison against background UTLs for metals that exceeded soil ESVs in at least one sample.

SERA (Step 2)

Maximum surface soil concentrations are compared to ESVs in Table L-25. Based upon this comparison, three metals (arsenic, manganese, and selenium) had HQs exceeding one based upon maximum detected concentrations and were identified as Step 2 COPCs. Iron was also identified as a Step 2 COPC because at least one sample exceeded the pH range on which the ESV was based. Two explosives (1,3,5-trinitrobenzene and 3,5-dinitroaniline) were detected in at least one surface soil sample but soil ESVs were not available. These two chemicals were also identified as Step 2 COPCs.

One metal (thallium) was not detected but maximum detection limits equaled or exceeded ESVs. Thallium was also identified as a Step 2 COPC.

BERA (Step 3A)

Mean concentrations in surface soil are compared to ESVs in Table L-25. Table L-25 also contains a comparison to background UTLs for the Step 2 metal COPCs. Iron and manganese did not exceed background UTLs. The mean HQ for arsenic did not exceed one. The mean HQ for selenium exceeded one and selenium also exceeded background UTLs. Thus, selenium was identified as a COPC for further risk evaluation (see Section 1.5.6). Two explosives (1,3,5-trinitrobenzene and 3,5-dinitroaniline) were detected in at least one surface soil sample but soil ESVs were not available. These two chemicals were also identified as COPCs for further risk evaluation.

1.5.2.2 Food Web Exposures

Chemicals with available bird and/or mammal Eco-SSLs were first screened against these Eco-SSLs (Table L-26). Those chemicals exceeding the Eco-SSLs based upon the maximum surface soil concentration (antimony, cadmium, chromium, lead, selenium, vanadium, and zinc) were retained for site-specific food web modeling. Chemicals with concentrations below the bird and mammal Eco-SSLs were not evaluated further for terrestrial food web exposures. The evaluation of antimony was based upon the maximum detection limit as this chemical was not detected in SMI surface soil samples.

SERA (Step 2)

HQs based upon maximum exposure doses for each upper trophic level terrestrial receptor are listed in Table L-27 (calculations are shown in Attachment L-1). Based upon a comparison to NOAELs, seven metals (antimony, cadmium, chromium, lead, selenium, vanadium, and zinc) had HQs exceeding one for one or more receptors. The exceedance for antimony was based upon reporting limits.

Ingestion TRVs were not available for any receptor for nitrobenzene. However, HQs would be less than one if a surrogate TRV (for 1,3,5-trinitrobenzene) was used for this chemical.

BERA (Step 3A)

HQs based upon 95 percent UCL exposure doses for each upper trophic level terrestrial receptor are listed in Table L-28 (calculations are shown in Attachment L-1). Based upon a comparison to NOAELs, antimony, chromium, and vanadium had HQs exceeding one for at least one receptor. The exceedance for antimony was based upon reporting limits; HQs for this chemical also exceeded one based upon the MATC and/or LOAEL for three receptors. HQs for vanadium also exceeded one based upon the MATC (but not the LOAEL) for the common ground dove.

HQs based upon mean exposure doses for each upper trophic level terrestrial receptor are listed in Table L-29 (calculations are shown in Attachment L-1). Only antimony had a HQ that exceeded one based upon the MATC (for the Norway rat, Indian mongoose, and velvet free-tailed bat), the defined threshold for a potential adverse effect in the final ERA protocol. The HQ based upon the LOAEL also exceeded one for the velvet free-tailed bat. Although antimony was not detected in SMI surface soil samples, antimony was retained as a COPC for further risk evaluation for terrestrial food web exposures.

1.5.3 Terrestrial Habitats – Lagoon Fringe Area Discrete Samples

This spatial area includes Decision Unit 3 (ECA Lagoon fringe) within which the deeper surface soil samples collected were intended to evaluate potential exposures for burrowing land crabs. Thus, only a comparison with soil ESVs was conducted.

1.5.3.1 Comparison with Soil ESVs

Maximum, mean, and 95% UCL surface soil concentrations are compared to soil ESVs in Table L-30. Table L-30 also contains a comparison against background UTLs for metals that exceeded soil ESVs in at least one sample.

SERA (Step 2)

Maximum surface soil concentrations are compared to ESVs in Table L-30. Based upon this comparison, two metals (manganese and selenium) had HQs exceeding one based upon maximum detected concentrations and were identified as Step 2 COPCs.

BERA (Step 3A)

Mean concentrations in surface soil are compared to ESVs in Table L-30. Table L-30 also contains a comparison to background UTLs for the Step 2 metal COPCs. Manganese and selenium did not exceed background UTLs. Thus, no chemicals were identified as COPCs for further risk evaluation in the deeper surface soil of the Lagoon Fringe area.

1.5.4 Terrestrial Habitats – Beach Area Discrete Samples

This spatial area includes Decision Unit 1 (beaches) within which the deeper surface soil samples collected were intended to evaluate potential exposures for buried sea turtle eggs. Thus, only a comparison with soil ESVs was conducted.

1.5.4.1 Comparison with Soil ESVs

Maximum, mean, and 95% UCL surface soil concentrations are compared to soil ESVs in Table L-31. Table L-31 also contains a comparison against background UTLs for metals that exceeded soil ESVs in at least one sample.

SERA (Step 2)

Maximum surface soil concentrations are compared to ESVs in Table L-31. Based upon this comparison, no chemical had a HQ that exceeded one based upon maximum detected concentrations. However, iron was identified as a Step 2 COPC because at least one sample exceeded the pH range on which the ESV was based.

One metal (selenium) was not detected but the maximum detection limit exceeded the ESV. Selenium was also identified as a Step 2 COPC.

BERA (Step 3A)

Mean concentrations in surface soil are compared to ESVs in Table L-31. Table L-31 also contains a comparison to background UTLs for the Step 2 metal COPCs. Iron did not exceed the background UTL. Thus, no chemicals were identified as COPCs for further risk evaluation in the deeper surface soil of the beach area.

Selenium was not detected but the mean detection limit exceeded the ESV. This chemical was not identified as a COPC for further risk evaluation but is discussed in the uncertainty section (Section 1.6).

1.5.5 Terrestrial Habitats – Upland Area Discrete Sample

Within Decision Unit 4 (Upland), a small, low-lying area near the coastline within the southwestern corner of the ECA was found to contain a colony of land crabs. A single deeper surface soil sample was collected to evaluate potential exposures for these burrowing land crabs. Thus, only a comparison with soil ESVs was conducted.

1.5.5.1 Comparison with Soil ESVs

Maximum and mean surface soil concentrations are compared to soil ESVs in Table L-32. Table L-32 also contains a comparison against background UTLs for metals that exceeded soil ESVs in at least one sample.

SERA (Step 2)

Maximum surface soil concentrations are compared to ESVs in Table L-32. Based upon this comparison, one metal (manganese) had a HQ exceeding one based upon the maximum detected concentration and was identified as a Step 2 COPC. Iron was also identified as a Step 2 COPC because the single sample pH exceeded the pH range on which the ESV was based.

One metal (selenium) was not detected but the maximum detection limit exceeded the ESV. Selenium was also identified as a Step 2 COPC.

BERA (Step 3A)

Mean concentrations in surface soil are compared to ESVs in Table L-32. Table L-32 also contains a comparison to background UTLs for the Step 2 metal COPCs. Iron and manganese did not exceed background UTLs. Thus, no chemicals were identified as COPCs for further risk evaluation in the deeper surface soil of the Upland area.

Selenium was not detected but the mean detection limit exceeded the ESV. This chemical was not identified as a COPC for further risk evaluation but is discussed in the uncertainty section (Section 1.6).

1.5.6 Aquatic Habitats – ECA Lagoon

Surface water and sediment samples from the ECA Lagoon were compared with ESVs and sediment samples were used to calculate food web exposures.

1.5.6.1 Comparison With Surface Water Screening Values

Maximum, mean, and 95% UCL surface water concentrations associated with the ECA Lagoon are compared to marine surface water ESVs in Table L-33.

SERA (Step 2)

Maximum surface water concentrations are compared to ESVs in Table L-33. Based upon this comparison for unfiltered samples, three metals (aluminum, copper, and iron) had HQs exceeding one based upon maximum detected concentrations. Copper and iron also exceeded ESVs for filtered samples based upon maximum detected

concentrations; aluminum was not detected in filtered samples. Thus, copper and iron were identified as Step 2 COPCs.

Two metals (cadmium and zinc) were not detected but maximum detection limits exceeded ESVs. These two chemicals were also identified as Step 2 COPCs.

BERA (Step 3A)

Mean surface water concentrations are compared to ESVs in Table L-33. Based upon this comparison for unfiltered samples, two metals (copper and iron) had HQs exceeding one based upon mean detected concentrations. Copper and iron also exceeded ESVs for filtered samples based upon mean detected concentrations. Thus, copper and iron were identified as COPCs for further risk evaluation.

1.5.6.2 Comparison With Sediment Screening Values

Maximum, mean, and 95% UCL sediment concentrations associated with the ECA Lagoon are compared to marine sediment ESVs in Table L-34.

SERA (Step 2)

Maximum sediment concentrations are compared to ESVs in Table L-34. Based upon this comparison, five metals (aluminum, barium, manganese, selenium, and vanadium) had HQs exceeding one based upon maximum detected concentrations and were identified as Step 2 COPCs. Two metals (beryllium and thallium), plus hexavalent chromium, were detected but an ESV was not available. These three chemicals were also identified as Step 2 COPCs.

One metal (antimony) and one explosive (nitrobenzene) were not detected but maximum detection limits exceeded ESVs. These two chemicals were also identified as Step 2 COPCs.

BERA (Step 3A)

Mean sediment concentrations are compared to ESVs in Table L-34. Based upon this comparison, manganese and selenium had HQs exceeding one based upon mean detected concentrations and were identified as COPCs for further risk evaluation.

Two metals (beryllium and thallium), plus hexavalent chromium, were detected but an ESV was not available. These three chemicals were also identified as COPCs for further risk evaluation.

1.5.6.3 Food Web Exposures

Food web exposures were evaluated for the lagoon based upon sediment concentrations. The evaluation of lead and silver were based upon the maximum detection limit as these chemicals were not detected in sediment samples from the lagoon. Due to the salinity of the lagoon, surface water samples were not considered as drinking water.

SERA (Step 2)

HQs based upon maximum exposure doses for each upper trophic level aquatic receptor are listed in Table L-35 (calculations are shown in Attachment L-2). Based upon a comparison to NOAELs, arsenic, chromium, copper, nickel, and selenium had HQs exceeding one for one or more receptors.

BERA (Step 3A)

HQs based upon 95 percent UCL exposure doses for each upper trophic level aquatic receptor are listed in Table L-36 (calculations are shown in Attachment L-2). Based upon a comparison to NOAELs, only selenium had a HQ exceeding one for at least one receptor. HQs based upon the MATC and LOAEL also exceeded one for the three insectivorous receptors.

HQs based upon mean exposure doses for each upper trophic level aquatic receptor are listed in Table L-37 (calculations are shown in Attachment L-2). Selenium had HQs that exceeded one based upon the MATC (for the spotted sandpiper, cave swallow, and velvet free-tailed bat), the defined threshold for a potential adverse effect in

the final ERA protocol. The HQ based upon the LOAEL also exceeded one for these three receptors. Thus, selenium was retained as a COPC for aquatic food web exposures in the lagoon.

1.5.7 Risk Evaluation

In this section, the various lines of evidence discussed in the previous section are integrated in order to evaluate the potential for unacceptable risks.

1.5.7.1 Terrestrial Habitats

Eleven assessment endpoints were developed for terrestrial habitats at the ECA (Table L-7). Lines of evidence for terrestrial habitats included: (1) comparison of surface soil concentrations with ESVs; (2) comparison of modeled dietary doses with ingestion TRVs; and (3) comparison of site surface soil concentrations with background concentrations.

One metal (selenium) was identified as a Step 3A COPC in surface soil (Section 1.5.2.1) based upon the SMI data. Selenium was detected in 19 of 27 site surface soil samples, but was above background in just 6 of these samples, with a maximum ratio of 1.68. Selenium occurrence is believed to be naturally occurring and related to its association with iron oxides, and is also not usually associated with munitions. Thus, selenium was not identified as a COC.

Two explosives (1,3,5-trinitrobenzene and 3,5-dinitroaniline) were detected in surface soil samples but could not be evaluated quantitatively because soil ESVs were not available. However, the maximum concentrations of these two explosives (12.0 and 13.0 µg/kg, respectively) were less than soil ESVs for other explosives (which ranged from 2,260 to 80,000 µg/kg [not including perchlorate, which is not technically an explosive]; see Table L-17). In addition, each explosive was detected in only one of 25 (1,3,5-trinitrobenzene) or 27 (3,5-dinitroaniline) samples and thus meets the frequency of detection criteria for exclusion discussed in Section 1.5.1.2. Thus, neither of these explosives was identified as a COC.

No chemicals were identified as COPCs for further risk evaluation in the Lagoon Fringe, Upland area, or Beach area based upon the deeper discrete surface soil samples.

The results of the terrestrial food web evaluation identified antimony as a COPC. However, because antimony was not detected in any SMI surface soil sample, this result is based upon reporting limits. Although no background incremental UTL was available for antimony, the background discrete UTL from the East Vieques background study (5.80 mg/kg; Table L-24) was greater than the ECA mean antimony surface soil concentration (5.00 mg/kg, the mean of one-half of the detection limits for the SMI soil samples). Thus, it is likely that antimony, if actually present in site soils, is at or below background levels and antimony was not identified as a COC.

In conclusion, no unacceptable risks were identified for terrestrial receptors associated with the ECA.

1.5.7.2 Aquatic Habitats

Nine assessment endpoints were developed for aquatic habitats at the ECA (Table L-7), which consisted of the ECA Lagoon. Lines of evidence for aquatic habitats included: (1) comparison of surface water and sediment concentrations with ESVs; (2) comparison of modeled dietary doses with ingestion TRVs; and (3) evaluation of soil concentrations for surface water and sediment COPCs.

In surface water, two metals (copper and iron) were identified as Step 3A COPCs in the ECA Lagoon (see 1.5.5.1). Neither of these metals was a Step 2 COPC in lagoon sediment. In addition, both copper and iron were below background UTLs in SMI soil samples, as well as in soil samples from the lagoon fringe. Thus, neither chemical has a likely anthropogenic source. In addition, the total copper concentrations were very uniform across the lagoon (range of 11.2 to 12.1 µg/L), as were the dissolved concentrations (range of 9.9 to 10.5 µg/L), suggesting that they are at naturally-occurring levels. The marine ESV for iron in the final ERA protocol (50 µg/L) was from a secondary source (Buchman, 2008). Consulting the primary source cited in Buchman (2008), British Columbia Ambient Aquatic Life Guidelines, indicated that the current document (March 2008) concludes that there are insufficient data to develop a marine-based value for iron. The freshwater value for dissolved iron (350 µg/L) from this reference is

higher than the maximum detected concentration in the lagoon (252 µg/L). Based upon this evaluation, no COCs were identified in lagoon surface water.

In sediment, manganese and selenium were identified as Step 3A COPCs in the ECA Lagoon (see 1.5.5.2) based upon detected concentrations exceeding ESVs. In addition, two metals (beryllium and thallium), plus hexavalent chromium, were identified as Step 3A COPCs because they were detected but an ESV was not available. Total chromium was well below sediment ESVs, suggesting that hexavalent chromium would not be elevated either. Beryllium and manganese were below background UTLs in SMI surface soil samples; thallium was not detected in SMI surface soil samples. All three of these metals were below background in soil samples from the lagoon fringe. Thus, none of these metals has a likely anthropogenic source.

Selenium exceeded background UTLs in 6 of 27 SMI surface soil samples by a small amount (maximum ratio of 1.68) but is believed to be naturally occurring (see Section 1.5.6.1). However, it was not detected in any of the five SMI surface soil samples from Decision Unit 3 (lagoon fringe), although detection limits (2 mg/kg) were slightly higher than the UTL (1.31 mg/kg). Selenium was below background in discrete soil samples from the lagoon fringe.

Based upon this evaluation, no COCs were identified in lagoon sediment.

For selenium, MATC-based HQs were as high as 6.60 (velvet free-tailed bat; Table L-37) and the LOAEL-based HQ was as high as 5.13. However, as discussed above, selenium in lagoon sediments is not likely elevated above background levels. Further, the sediment-invertebrate BAF used in the food web model was based upon mollusks (due to the lack of data for other taxa), which are not prey items for the spotted sandpiper, cave swallow, or velvet free-tailed bat. CDWR (2006) reports a regression equation for selenium uptake from sediment to the tissues of aquatic insects (corixids) from a hypersaline water body in California (salinity of about 45 ppt, within the range observed in the ECA Lagoon; Table L-1). This equation is for an aquatic invertebrate species more likely to be consumed by the sandpiper and more representative of consumption by the two aerial insectivorous receptors. The equation is as follows:

$$\text{Insect Se Concentration (mg/kg dw)} = 10^{(0.239+(0.359*\log(\text{Se Sediment Concentration, mg/kg})))}$$

Using this equation and the mean sediment concentration of selenium (1.79 mg/kg) yields an insect tissue concentration of 2.137 mg/kg dry weight. Entering this calculated tissue concentration into the food web model (for mean exposures; Table L-38) would result in MATC-based HQs below one for all receptors except the velvet free-tailed bat (HQ of 1.42), whose LOAEL-based HQ also exceeded one by a small amount (HQ of 1.10). However, as discussed in Section 1.2.3.4 and Section 1.6, there is a high degree of uncertainty regarding the estimation of bioaccumulated chemicals in aerial insects that are consumed by insectivorous bats (free-tailed bat) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates and are thus likely to overestimate tissue concentrations. In addition, NIWQP (1998) reports (based upon a review of 27 studies) a preliminary toxic threshold for selenium of 2.5 mg/kg in sediment (population-based EC_{10} for fish and birds in freshwater systems); the EC_{100} for such effects was estimated to be about 4.0 mg/kg. This threshold (2.5 mg/kg) is similar to the maximum observed selenium concentration in ECA Lagoon sediments (2.7 mg/kg) and above both the 95% UCL (2.08 mg/kg) and mean (1.79 mg/kg) sediment concentrations in the lagoon. For these reasons, selenium is not considered a COC for aquatic food web exposures at the site.

In conclusion, no unacceptable risks were identified for aquatic receptors associated with the ECA Lagoon.

1.5.8 Risk Summary and Conclusions

No COCs were identified for surface soil, surface water, or sediment exposures at the ECA. Similarly, no COCs were identified for food web exposures. Thus, risks to ecological receptors are considered acceptable under current site conditions.

1.6 Uncertainties

Uncertainties are present in all risk assessments because of the limitations of the available data and the need to make certain assumptions and extrapolations based on incomplete information. In addition, the use of various models (e.g., uptake and food web exposures) carries with it some associated uncertainty as to how well the model

reflects actual conditions. Since conservative assumptions were generally used in the exposure and effects assessments, these uncertainties are more likely to result in an overestimation rather than an underestimation of the likelihood and magnitude of risks to ecological receptors. The uncertainties in this ERA are mainly attributable to the following factors:

- Reporting Limits - Reporting limits for some undetected analytes exceeded applicable ESVs in some media. Table L-39 summarizes these constituents, by medium, and reports both the ratio of the minimum and maximum reporting limits to the ESV as well as the ratio of the mean value (calculated using one-half of the reporting limit for each sample) to the ESV. Because these constituents were not detected, they are not known to be present on the site but the potential for unacceptable risks cannot be totally discounted because the reporting limits are higher than the ESVs. The magnitude of the ratios can be used to qualitatively evaluate the magnitude of the associated uncertainty (e.g., there is more uncertainty in terms of the potential for risk for a ratio of 100 relative to a ratio of 10). In surface soil, there was only one chemical (selenium) whose mean ratio exceeded one (for beach and upland discrete samples) and this ratio was less than five. In surface water, mean reporting limits exceeded ESVs only for dissolved aluminum and this ratio was less than 10. In sediment, no chemical had a mean ratio that exceeded one.

  In summary, there were very few chemicals with mean ratios that exceeded one and none exceeded 10, suggesting that the associated uncertainties are relatively low. Because standard analytical methods were used and the sample reporting limits were not elevated relative to the method reporting limits for the vast majority of samples and analytes, these uncertainties are considered acceptable and are unlikely to impact the conclusions of the ERA.

- Duplicate Analyses - When evaluating samples with field duplicates, the value used in the ERA was always the detect when one result was a detect and the duplicate was a non-detect, regardless of whether or not the non-detected value was higher. In these cases, the use of the detect has less uncertainty since it represents an actual measured value (versus an upper limit bound) and the two samples will have identical or similar reporting limits.

- Selection of COPCs - Chemicals without available ESVs for a medium were not retained as COPCs for risk evaluation unless they were detected. These uncertainties are unlikely to impact the conclusions of the ERA since these chemicals are not known to be present on the site.

- Ingestion TRVs - Data on the toxicity of many chemicals to the receptor species were sparse or lacking, requiring the extrapolation of data from other wildlife species or from laboratory studies with non-wildlife species. This is a typical limitation and extrapolation for ERAs because so few wildlife species have been tested directly for most chemicals. The uncertainties associated with toxicity extrapolation were minimized through the selection of the most appropriate test species for which suitable toxicity data were available. The factors considered in selecting a test species to represent a receptor species included taxonomic relatedness, trophic level, foraging method, and similarity of diet. It is difficult to predict if these extrapolations would result in overestimating or underestimating potential risks.

  A second uncertainty related to the derivation of ingestion TRVs applies to metals. Most of the toxicological studies on which the ingestion TRVs for metals were based used forms of the metal (such as salts) that have high water solubility and high bioavailability to receptors. Because the analytical samples on which site-specific exposure estimates were based measured total metal, regardless of form, and these highly bioavailable forms are expected to compose only a fraction of the total metal concentration, this is likely to result in an overestimation of potential risks for these chemicals but not to the extent that it would unduly impact the conclusions of the ERA.

  A third source of uncertainty related to the derivation of ingestion-based TRVs applies to mercury and selenium. The ingestion-based TRVs used for these two metals were based on organometallic (methylated) forms. TRVs for inorganic forms tend to be substantially higher. Given that inorganic forms likely contribute significantly to the total mercury and selenium, use of TRVs based on organometallic forms tends to make the TRVs for these metals extremely conservative and likely overestimates potential risk.

- Chemical Mixtures - Information on the toxicological effects of chemical interactions is generally lacking for ecological receptors, which required (as is standard for ERAs) that the chemicals be evaluated on a compound-by-compound basis during the comparison to ESVs. This could result in an underestimation of risk (if there are additive or synergistic effects among chemicals) or an overestimation of risks (if there are antagonistic effects among chemicals).

- Receptor Species Selection - Reptiles were selected as receptors in the ERA, but were not evaluated quantitatively even when exposure pathways were likely to be complete. For food web exposures, this taxon was evaluated using other fauna (birds and mammals) as surrogates due to the general lack of taxon-specific toxicological data. This represents an uncertainty in the ERA.

  It was also assumed that any reptiles present in the aquatic habitats adjacent to the site were not exposed to significantly higher concentrations of chemicals and were not more sensitive to chemicals than other receptor species evaluated in the ERA. This assumption was a source of uncertainty in the ERA. In addition, there is some uncertainty associated with the use of specific receptor species to represent larger groups of organisms (e.g., guilds).

  The evaluation of deeper surface soil (depths of 18 – 24 inches) collected from potential sea turtle nesting habitat (beach decision unit) for the protection of turtle eggs utilized the general soil ESVs developed in the final ERA protocol. This represents an uncertainty in the ERA because turtle eggs may be more sensitive to chemicals than the receptors on which the soil ESVs were based (plants and soil invertebrates). However, all detected metals in these deeper beach samples were well below background UTLs, and explosives were not detected in any of these samples, suggesting that the ESV extrapolation had no direct impact on the conclusions reached for this exposure pathway.

- Food Web Exposure Modeling - Chemical concentrations in aquatic food items (plants, benthic invertebrates, and fish) were modeled from measured sediment concentrations and were not directly measured. Chemical concentrations in terrestrial food items (plants, earthworms, and small mammals) were modeled from measured surface soil concentrations and were not directly measured. The use of generic, literature-derived exposure models and bioaccumulation factors introduces some uncertainty into the resulting estimates. The values selected and methodology employed were intended to provide a conservative (SERA) or reasonable (Step 3A) estimate of potential food web exposure concentrations.

  Another source of uncertainty is the use of default assumptions for exposure parameters such as BCFs and BAFs. Although BCFs or BAFs for many bioaccumulative chemicals were readily available from the literature and were used in the ERA, the use of a default factor of 1.0 to estimate the concentration of some chemicals in receptor prey items is a source of uncertainty.

  There is a high degree of uncertainty in estimating chemical concentrations in the tissues of aerial insects that are consumed by insectivorous bats (free-tailed bat) and birds (cave swallow) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates. However, it is expected that the emergent (aerial) forms of insects, which typically have higher proportions of soft tissues, would typically have lower concentrations of non-lipophilic chemicals (such as metals and explosives) than the soil/benthic forms since exoskeletons are not typically retained at emergence. Thus, modeled tissue concentrations are likely to be conservative for the chemicals groups (metals and explosives) evaluated for this exposure pathway in this ERA.

  There is also some uncertainty in estimating chemical concentrations in non-vegetative parts of plants, such as fruit or nectar, consumed by some receptors (fruit bat) since the uptake models estimate uptake into the above-ground vegetative portions of plants. However, available data suggest that bioaccumulation into the non-vegetated portions of plants is lower than for the vegetative portion of plants for the metals modeled (Baes et al., 1984). Thus, the approach used was conservative in that the tissue concentrations are likely to have been overestimated.

Area use factors were assumed to equal one. This is a conservative assumption since a significant percentage of each upper trophic level receptor species' time could be spent foraging off-site in unimpacted areas or in areas where chemical concentrations are expected to be significantly lower.

- Total Versus Dissolved Metals - USEPA guidance (USEPA, 1996a) indicates that the dissolved metal fraction should be preferentially used to the total metal fraction in surface water screening. Both total and dissolved concentrations were used in the ERA for the surface water screen. High levels of suspended solids and sediment-adsorbed metals would result in overstating bioavailable surface water concentrations and thus potential exposures and risks.
- Mean Versus Maximum Media Concentrations - As is typical in an ERA, a finite number of samples of environmental media are used to develop the exposure estimates. The maximum measured concentration provides a conservative estimate for immobile biota or those with a limited home range. The most realistic exposure estimates for mobile species with relatively large home ranges and for species populations (even those that are immobile or have limited home ranges) are those based upon the mean chemical concentrations in each medium to which these receptors are exposed. This is reflected in the wildlife dietary exposure models contained in the *Wildlife Exposure Factors Handbook* (USEPA, 1993), which specify the use of average media concentrations. Given the mobility of the upper trophic level receptor species used in the ERA, the use of maximum chemical concentrations (rather than mean concentrations) in the SERA to estimate the exposure via food webs is very conservative. This conservatism was reduced to more realistic levels in the values selected for use in the Step 3A evaluation.
- Comparisons to Background Concentrations - Background concentrations were used to judge the site-relatedness of individual chemicals in surface soil. If site concentrations were consistent with background levels, it was assumed that the concentrations were not related to known site-related source areas. There exists the possibility that concentrations below background were indeed site-related, rendering the assumption false. However the potential impact of this possibility is minimal since chemicals at concentrations consistent with background should exhibit no different ecological effects than commonly occurring in areas not affected by releases, regardless of their source.

1.7 References

Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor. 1984. *A review and analysis of parameters for assessing transport of environmentally released radionuclides through agriculture.* Oak Ridge National Laboratory. ORNL-5786. 148 pp.

Bauer, L.J. and M.S. Kendall (eds). 2010. *An Ecological Characterization of the Marine Resources of Vieques, Puerto Rico. Part II: Field Studies of Habitats, Nutrients, Contaminants, Fish, and Benthic Communities*. NOAA Technical Memorandum NOS NCCOS 110. Silver Spring, MD. 174 pp.

Bechtel Jacobs. 1998a. *Empirical models for the uptake of inorganic chemicals from soil by plants.* Prepared for U.S. Department of Energy. BJC/OR-133. September 1998.

Bechtel Jacobs. 1998b. *Biota sediment accumulation factors for invertebrates: review and recommendations for Oak Ridge Reservation.* Prepared for U.S. Department of Energy. BJC/OR-112. August 1998.

Beyer, W.N., E.E. Connor, and S. Gerould. 1994. Estimates of soil ingestion by wildlife. *Journal of Wildlife Management.* 58:375-382.

Brooke, A.P. 1994. Diet of the fishing bat, *Noctilio leporinus* (Chiroptera: Noctilionidae). *Journal of Mammology.* 75:212-218.

Buchman, M.F. 2008. *NOAA screening quick reference tables.* NOAA OR&R Report 08-1, Seattle, WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration. 34 pp.

California Department of Water Resources (CDWR). 2006. *Salton Sea Ecosystem Restoration Program. Draft Programmatic Environmental Impact Report.* Prepared by Department of Water Resources and Department of Fish and Game, with assistance from CH2M HILL. State Clearinghouse #2004021120. October.

Canadian Council of Ministers of the Environment (CCME). 2007. *Canadian soil quality guidelines for the protection of environmental and human health.* Summary Tables. Update 7.0. September.

CH2M HILL, Inc. 2011a. *The Eastern Conservation Area (ECA) Remedial Investigation (RI) Sampling and Analysis Plan (SAP).* January.

CH2M HILL, Inc. 2011b. *Technical Memorandum, Rationale for Not Needing Groundwater Data at the Eastern Conservation Area.* 12 July.

CH2M HILL, Inc. 2010a. *Master Standard Operating Procedures, Protocols, and Plans. Environmental Restoration Program. Vieques, Puerto Rico*. Final. April.

CH2M HILL, Inc. 2010b. *Master Ecological Risk Assessment Protocol for Vieques Environmental Restoration Program – Update 1 (Addendum)*. Draft. August.

CH2M HILL, Inc. 2010c. *Draft Interim Deliverable for the Ecological Risk Assessment – Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico*. June.

CH2M HILL, Inc. 2007. *Final East Vieques background soil inorganics investigation report, Former Vieques Naval Training Range, Vieques, Puerto Rico.* Prepared for Department of the Navy, NAVFAC Atlantic. October.

Chief of Naval Operations (CNO). 1999. *Navy policy for conducting ecological risk assessments.* Memorandum from Chief of Naval Operations to Commander, Naval Facilities Engineering Command. Ser N453E/9U595355.

Cope, W.G., J.G. Wiener, and R.G. Rada. 1990. Mercury accumulation in yellow perch in Wisconsin seepage lakes: relation to lake characteristics. *Environmental Toxicology and Chemistry.* 9:931-940.

Dunning, J.B., Jr. (editor). 2008. *CRC handbook of avian body masses, second edition.* CRC Press, Boca Raton, FL.

Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten. 1997a*. Toxicological benchmarks for screening contaminants of potential concern for effects on terrestrial plants: 1997 revision.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-85/R3.

Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997b. *Toxicological benchmarks for screening contaminants of potential concern for effects on soil and litter invertebrates and heterotrophic process: 1997 revision.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-126/R2.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook. A field guide to the natural history of North American birds.* Simon and Schuster/Fireside. New York, NY.

Geo-Marine. 2007. *Biological Assessment of the Former Live Impact Area within the Former Vieques Naval Training Range, Vieques, Puerto Rico, Amendment I: Eastern Conservation Area.*

Geo-Marine. 2003. Integrated Natural Resources Management Plan (INRMP). Navy Lands on Vieques, Vieques Island, Puerto Rico. Plan Years 2003-2012. Final Draft.

Geo-Marine. 2002. *Mangrove Forest Health Status Vieques Island, Naval Station Roosevelt Roads, Puerto Rico.* March. Draft.

Hirsch, M.P. 1998. Bioaccumulation of silver from laboratory-spiked sediments in the oligochaete (*Lumbriculus variegatus*). *Environmental Toxicology and Chemistry.* 17:605-609.

Humphreys, D. J. 1988. *Veterinary toxicology.* ISBN 0702012491.

Johnson, M.S., C.J. Salice, B.E. Sample, and P.Y. Robidoux. 2009. Bioconcentration, bioaccumulation, and biomagnification of nitroaromatic and nitramine explosives in terrestrial systems. Pages 227-252 IN Sunahara, G.I., G. Lotufo, R.G. Kuperman, and J. Hawari (eds). *Ecotoxicology of explosives*. CRC Press, Boca Raton, FL. 325 pp.

Johnson, M.S. and C.J. Salice. 2009. Toxicity of energetic compounds to wildlife species. Pages 157-175 IN Sunahara, G.I., G. Lotufo, R.G. Kuperman, and J. Hawari (eds). *Ecotoxicology of explosives*. CRC Press, Boca Raton, FL. 325 pp.

Jones, D.S., G.W. Suter II, and R.N. Hull. 1997. *Toxicological benchmarks for screening contaminants of potential concern for effects on sediment-associated biota: 1997 revision.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-95/R4.

Krantzberg, G. and D. Boyd. 1992. The biological significance of contaminants in sediment from Hamilton Harbour, Lake Ontario. *Environmental Toxicology and Chemistry.* 11:1527-1540.

Linzey, D.W. 1998. *The mammals of Virginia*. Blacksburg, Virginia: The McDonald & Woodward Publishing Company, Inc.

Long, E.R. and L.G. Morgan. 1990. *The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program.* NOAA Technical Memorandum NOS OMA 52. March.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management.* 19:81-97.

Martin, A.C., H.S. Zim, and A.L. Nelson. 1951. *American wildlife and plants: a guide to wildlife food habits.* Dover Publications, Inc. New York, NY. 500 pp.

Menzie, C.A., D.E. Burmaster, J.S. Freshman, and C.A. Callahan. 1992. Assessment of methods for estimating ecological risk in the terrestrial component: a case study at the Baird & McGuire Superfund Site in Holbrook, Massachusetts*. Environmental Toxicology and Chemistry.* 11:245-260.

Nagy, K. A. 2001. Food requirements of wild animals: predictive equations for free-living mammals, reptiles, and birds. *Nutrition Abstracts and Reviews. Series B.* 71:21R-31R.

National Irrigation Water Quality Program (NIWQP). 1998. *Guidelines for interpretation of the biological effects of selected constituents in biota, water, and sediment.* National Irrigation Water Quality Program Information Report No. 3. U.S. Department of the Interior, Denver, CO. November.

National Research Council Canada (NRCC). 2006. *Development of ecological and human health preliminary soil quality guidelines for energetic materials to ensure training sustainability of Canadian forces.* Final Report (Revised), NRC #45936. 30 June.

Naval Facilities Engineering Command (NAVFAC). 2007. *Ecological risk assessment Tier 1 screening, Supplemental RI at Operable Unit 2, Jackson Park Housing Complex/Naval Hospital Bremerton, Bremerton, Washington.* Draft. April.

Naval Facilities Engineering Command (NAVFAC). 2003. *Navy guidance for conducting ecological risk assessments.* http://web.ead.anl.gov/ecorisk/. February.

Nellis, D.W. 1989. *Herpestes auropunctatus*. Mammalian species. Number 342. American Society of Mammalogists, New York, New York, USA.

Nipper, M., R.S. Carr, J.M. Biedenbach, R.L. Hooten, and K. Miller. 2002. Toxicological and chemical assessment of ordnance compounds in marine sediments and porewaters. *Marine Pollution Bulletin.* 44:789-806.

Nipper, M., R.S. Carr, J.M. Biedenbach, R.L. Hooten, K. Miller, and S. Saepoff. 2001. Development of marine toxicity data for ordnance compounds. *Archives of Environmental Contamination and Toxicology.* 41:308-318.

Oberle, M.W. 2000. *Puerto Rico's birds in photographs*. Editorial Humanitas, Mr. Mark Oberle, 23rd Avenue E. Seattle, Washington, 98112-2936. 129 pp.

Ortega, J. and I. Castro-Arellano. 2001. *Artibeus jamaicensis*. Mammalian Species No. 662. American Society of Mammalogists.

Pascoe, G.A., R.J. Blanchet, and G. Linder. 1996. Food chain analysis of exposures and risks to wildlife at a metals-contaminated wetland. *Archives of Environmental Contamination and Toxicology.* 30:306-318.

PTI Environmental Services (PTI). 1995. *Bioaccumulation factor approach analysis for metals and polar organic compounds*. Washington State Department of Ecology. CA0U-03-03. October.

Puerto Rico, Commonwealth of. Office of the Governor, Environmental Quality Board (PREQB). 2010. *Puerto Rico water quality standards regulation.* March.

Reid, F.A. 2009. *A field guide to the mammals of Central America and Southeast Mexico. Second edition.* Oxford University Press.

Sample, B.E., J.J. Beauchamp, R.A. Efroymson, G.W. Suter II, and T.L. Ashwood. 1998a. *Development and validation of bioaccumulation models for earthworms.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-220.

Sample, B.E., J.J. Beauchamp, R.A. Efroymson, and G.W. Suter II. 1998b. *Development and validation of bioaccumulation models for small mammals.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-219.

Sample, B.E., M.S. Aplin, R.A. Efroymson, G.W. Suter II, and C.J.E. Welsh. 1997. *Methods and tools for estimation of the exposure of terrestrial wildlife to contaminants.* Environmental Sciences Division, Oak Ridge National Laboratory. ORNL/TM-13391.

Sample, B.E. and G.W. Suter II. 1994. *Estimating exposure of terrestrial wildlife to contaminants.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-125.

Sample, B.E., D.M. Opresko, and G.W. Suter II. 1996. *Toxicological benchmarks for wildlife: 1996 revision.* Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-86/R3.

Silva, M. and J.A. Downing. 1995. *CRC handbook of mammalian body masses*. CRC Press, Boca Raton, FL. 359 pp.

Simmons, G.J. and M.J. McKee. 1992. Alkoxyresorufin metabolism in white-footed mice at relevant environmental concentrations of Aroclor 1254*. Fundamental and Applied Toxicology.* 19:446-452.

Stroud, D.C. 1982. Population dynamics of *Rattus rattus* and *R. norvegicus* in a riparian habitat. *Journal of Mammalogy.* 63:151-154.

Suter, G.W. II. 1993. *Ecological risk assessment*. Chelsea, Mich.: Lewis Publishers.

Suter, G.W. II. 1990. Endpoints for regional ecological risk assessment*. Environmental Management* 14:9-23.

Suter, G.W. II. 1989. Ecological endpoints. In *Ecological assessment of hazardous waste sites: a field and laboratory reference.* Ed. W. Warren-Hicks, B.R. Parkhurst, and S.S. Baker Jr., Chapter 2*.* EPA/600/3-89/013.

Suter, G.W. II and C.L. Tsao. 1996. *Toxicological benchmarks for screening potential contaminants of concern for effects on aquatic biota: 1996 revision.* Environmental Restoration Division, ORNL Environmental Restoration Program, ES/ER/TM-96/R2. 54 pp.

Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic Munition Compounds: Environmental Effects and Screening Values*. Reviews of Environmental Contamination and Toxicology.* 161:1-156.

Thomann, R.V., J.D. Mahony, and R. Mueller. 1995. Steady-state model of biota sediment accumulation factor for metals in two marine bivalves. *Environmental Toxicology and Chemistry.* 14:1989-1998.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). 2007. *Wildlife toxicity assessment for perchlorate*. Document No. 87-MA02T6-05D. Final. February

U.S. Army Corps of Engineers (USACOE). 2010. *BSAF Database.* http://el.erdc.usace.army.mil/bsafnew/bsaf.html. Accessed February 2010.

U.S. Environmental Protection Agency (USEPA). 2009*. National recommended water quality criteria - 2009.*

U.S. Environmental Protection Agency (USEPA). 2008. *Ecological soil screening levels for chromium.* OSWER Directive 9285.7-66. April.

U.S. Environmental Protection Agency (USEPA). 2007a. *Ecological soil screening levels for copper*. OSWER Directive 9285.7-68. February.

U.S. Environmental Protection Agency (USEPA). 2007b. *Ecological soil screening levels for manganese*. OSWER Directive 9285.7-71. April.

U.S. Environmental Protection Agency (USEPA). 2007c. *Ecological soil screening levels for nickel.* OSWER Directive 9285.7-76. March.

U.S. Environmental Protection Agency (USEPA). 2007d. *Ecological soil screening levels for selenium.* OSWER Directive 9285.7-72. July.

U.S. Environmental Protection Agency (USEPA). 2007e. *Ecological soil screening levels for zinc.* OSWER Directive 9285.7-73. June.

U.S. Environmental Protection Agency (USEPA). 2007f*. Guidance for developing ecological soil screening levels. Attachment 4-1.* OSWER Directive 9285.7-55. April.

U.S. Environmental Protection Agency (USEPA). 2006a. *Ecological soil screening levels for silver*. OSWER Directive 9285.7-77. September.

U.S. Environmental Protection Agency (USEPA). 2006b. *EPA Region III BTAG screening benchmarks.* July/August.

U.S. Environmental Protection Agency (USEPA). 2005a. *Ecological soil screening levels for antimony.* OSWER Directive 9285.7-61. February.

U.S. Environmental Protection Agency (USEPA). 2005b. *Ecological soil screening levels for arsenic.* OSWER Directive 9285.7-62. March.

U.S. Environmental Protection Agency (USEPA). 2005c. *Ecological soil screening levels for barium*. OSWER Directive 9285.7-63. February.

U.S. Environmental Protection Agency (USEPA). 2005d. *Ecological soil screening levels for beryllium.* OSWER Directive 9285.7-64. February.

U.S. Environmental Protection Agency (USEPA). 2005e. *Ecological soil screening levels for cadmium.* OSWER Directive 9285.7-65. March.

U.S. Environmental Protection Agency (USEPA). 2005f. *Ecological soil screening levels for cobalt.* OSWER Directive 9285.7-67. March.

U.S. Environmental Protection Agency (USEPA). 2005g. *Ecological soil screening levels for lead.* OSWER Directive 9285.7-70. March.

U.S. Environmental Protection Agency (USEPA). 2005h. *Ecological soil screening levels for vanadium.* OSWER Directive 9285.7-75. April.

U.S. Environmental Protection Agency (USEPA). 2003a. *Ecological soil screening level for aluminum*. OSWER Directive 9285.7-60. November.

U.S. Environmental Protection Agency (USEPA). 2003b. *Ecological soil screening level for iron*. OSWER Directive 9285.7-69. November.

U.S. Environmental Protection Agency (USEPA). 2002*. Perchlorate environmental contamination: toxicological review and risk characterization.* External Review Draft. 16 January. NCEA-1-0503.

U.S. Environmental Protection Agency (USEPA). 2001. *Supplemental guidance to RAGS: Region 4 ecological risk assessment bulletins.* Web version – 30 November.

U.S. Environmental Protection Agency (USEPA). 2000*. Bioaccumulation testing and interpretation for the purpose of sediment quality assessment - status and needs.* EPA/823/R-00/001.

U.S. Environmental Protection Agency (USEPA). 1999. *Screening level ecological risk assessment protocol for hazardous waste combustion facilities.* EPA/530/D-99/001A. Peer Review Draft. August.

U.S. Environmental Protection Agency (USEPA). 1997a. *Ecological risk assessment guidance for Superfund: process for designing and conducting ecological risk assessments.* Interim Final. EPA/540/R-97/006.

U.S. Environmental Protection Agency (USEPA). 1997b. *Mercury study report to Congress. Volume VI: an ecological assessment of anthropogenic mercury emissions in the United States.* EPA/452/R-97/008.

U.S. Environmental Protection Agency (USEPA). 1997c. *The incidence and severity of sediment contamination in surface waters of the United States. Volume 1: National Sediment Quality Survey.* EPA/823/R-97/006.

U.S. Environmental Protection Agency (USEPA). 1996a. *Ecotox thresholds.* Eco Update, Volume 3, Number 2. EPA/540/F-95/038. 12 pp.

U.S. Environmental Protection Agency (USEPA). 1996b. *Superfund chemical data matrix.* EPA/540/R-96/028.

U.S. Environmental Protection Agency (USEPA). 1995a. *Internal report on summary of measured, calculated and recommended log K_{ow} values.* Environmental Research Laboratory, Athens, GA. 10 April.

U.S. Environmental Protection Agency (USEPA). 1995b. *Great Lakes Water Quality Initiative criteria documents for the protection of wildlife: DDT, mercury, 2,3,7,8-TCDD, PCBs.* EPA/820/B-95/008.

U.S. Environmental Protection Agency (USEPA). 1993. *Wildlife exposure factors handbook. Volume I of II.* EPA/600/R-93/187a.

U.S. Environmental Protection Agency (USEPA). 1990. *Assessment of risks from exposure of humans, terrestrial and avian wildlife, and aquatic life to dioxins and furans from disposal and use of sludge from bleached kraft and sulfite pulp and paper mills.* EPA/560/5-90/013.

U.S. Environmental Protection Agency (USEPA). 1989. *Risk assessment guidance for Superfund, Volume I. Human health evaluation manual (Part A).* Interim Final. EPA/540/1-89/002.

Wentsel, R.S., T.W. LaPoint, M. Simini, R.T. Checkai, D. Ludwig, and L.W. Brewer. 1996. *Tri-service procedural guidelines for ecological risk assessments.* U.S. Department of the Navy, U.S. Department of the Air Force, and U.S. Department of the Army. June.

Tables

TABLE L-1
Water Column Parameter Measurements - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Date	Time	Depth of Water (ft)	Sample Depth (ft)	Conductivity (umhos/cm)	DO (mg/L)	Salinity (ppt)	Temperature (^{o}C)	pH (SU)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
VEECA-5SW01	2/11/2011	8:50	1.00	0.50	32,880	5.70	20.57	23.50	7.40	865.8	155
VEECA-5SW02	2/11/2011	9:22	1.00	0.50	33,122	6.02	20.73	23.84	7.48	890.9	155
VEECA-5SW03	2/11/2011	9:00	1.05	0.50	33,029	6.12	20.67	23.51	7.54	876.4	197
VEECA-5SW04	2/11/2011	9:12	1.10	0.50	33,141	6.17	20.75	23.68	7.56	881.7	214
VEECA-5SW05	2/11/2011	9:07	1.00	0.50	33,056	5.08	20.69	23.64	7.35	877.2	214
		Average	1.03		33,046	5.82	20.68	23.63	7.47	878.4	187
16P (NOAA)	10/22/2007	--	0.07	--	--	--	--	--	--	--	--
17P (NOAA)	10/22/2007	--	0.07	--	1,800 *	8.23	--	31.5	--	--	--
18P (NOAA)	10/22/2007	--	0.07	--	120,900	5.40	77.6	31.7	--	--	--
		Average	0.07	--	120,900	6.82	77.6	31.6	--	--	--

-- = no data available
* = this value may be an error, considering the much higher conductivity (and corresponding high salinity) at nearby Station 18P, and the expectation of hypersaline conditions in the very shallow water (about 1 inch) relative to deeper water (about 12 inches) conditions in 2011. This value is not included in the site average.
NOAA = National Oceanic and Atmospheric Administration (Bauer, L.J. and M.S. Kendall, 2010)
DO - dissolved oxygen
^{o}C - degrees Celsius
ft - feet
ppt - parts per thousand
mg/L - milligrams per liter
µmhos/cm - micromhos per centimeter
SU - standard units
mV - millivolts
NTU - Nephelometric Turbidity Units

TABLE L-2
Physical Sediment Parameter Measurements - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Sample ID	Sample Date	pH (SU)	Total Organic Carbon (MG/KG)	Gravel (%)	Coarse Sand (%)	Medium Sand (%)	Fine Sand (%)	Silt/Clay (%)
VEECA-5SD01	VEECA-5SD01-000H-0211	2/10/2011	8.00	11,400	0.0	0.0	2.9	8.0	89.1
VEECA-5SD02	VEECA-5SD02-000H-0211	2/10/2011	8.40	10,700	0.0	0.0	6.6	18.9	74.5
VEECA-5SD02	VEECA-5SD02P-000H-0211	2/10/2011	8.40	30,600	NS	NS	NS	NS	NS
VEECA-5SD03	VEECA-5SD03-000H-0211	2/10/2011	8.40	4,850	0.0	0.0	2.7	9.7	87.6
VEECA-5SD04	VEECA-5SD04-000H-0211	2/10/2011	8.30	15,200	0.0	0.0	17.4	28.4	54.2
VEECA-5SD05	VEECA-5SD05-000H-0211	2/10/2011	8.40	5,260	0.0	0.0	2.5	9.1	88.4
VEECA-5SD06	VEECA-5SD06-000H-0211	2/10/2011	8.40	4,620	0.0	0.0	6.0	13.6	80.4
VEECA-5SD07	VEECA-5SD07-000H-0211	2/10/2011	8.30	20,400	0.0	0.0	2.7	8.5	88.8
VEECA-5SD08	VEECA-5SD08-000H-0211	2/10/2011	8.30	17,200	0.0	0.0	3.1	13.2	83.7
VEECA-5SD09	VEECA-5SD09-000H-0211	2/10/2011	8.30	14,000	0.0	0.0	2.0	6.5	91.5
VEECA-5SD10	VEECA-5SD10-000H-0211	2/10/2011	8.20	14,000	0.0	0.0	4.6	9.4	86.0
VEECA-5SD11	VEECA-5SD11-000H-0211	2/10/2011	8.40	21,900	0.0	0.0	14.3	26.2	59.5
VEECA-5SD11	VEECA-5SD11P-000H-0211	2/10/2011	8.40	31,100	NS	NS	NS	NS	NS
VEECA-5SD12	VEECA-5SD12-000H-0211	2/10/2011	8.10	18,400	0.0	6.0	12.7	32.1	49.2
VEECA-5SD13	VEECA-5SD13-000H-0211	2/10/2011	8.20	15,500	0.0	0.0	25.2	31.0	43.8
VEECA-5SD14	VEECA-5SD14-000H-0211	2/10/2011	8.40	11,300	0.0	0.0	7.9	18.9	73.2
VEECA-5SD15	VEECA-5SD15-000H-0211	2/10/2011	8.20	14,100	38.4	5.5	10.3	29.7	16.1
		Average	8.30	15,325	2.6	0.8	8.1	17.5	71.1

mg/kg - milligram per kilogram
SU - standard units

TABLE L-3
Animals and Plants Observed at the ECA
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Common Name	Scientific Name
Mammals	
Mongoose	*Herpestes auropunctatus*
Birds	
Adelaide's warbler	*Dendroica adelaidae*
American kestrel	*Falco sparverius*
American oystercatcher	*Haematopus ostralegus*
American white pelican	*Pelecanus erythrorhynchos*
Antillean crested hummingbird	*Orthorhyncus cristatus*
Antillean grackle	*Quiscalus niger greater*
Bananaquit	*Coereba flaveola*
Black bellied plover	*Pluvialis squatarola*
Blue-winged teal	*Anas discors*
Brown booby	*Sula leucogaster*
Brown pelican	*Pelecanus occidentalis*
Caribbean elaenia	*Elaenia martinica*
Caribbean martin	*Progne dominicensis*
Gray kingbird	*Tyrannus dominicensis*
Greater yellowlegs	*Tringa melanoleuca*
Killdeer	*Charadrius vociferous*
Lesser yellowlegs	*Tringa flavipes*
Magnificent frigatebird	*Fregata magnificens*
Mangrove cuckoo	*Coccyzus minor*
Northern mockingbird	*Mimus polyglottos*
Osprey	*Pandion haliaetus*
Puerto Rican woodpecker	*Melanerpes portoricensis*
Ruddy turnstone	*Arenaria interpres*
White-cheeked pintail	*Anas bahamensis*
White-tailed tropicbird	*Phaethon lepturus*
Wilson's plover	*Charadrius wilsonia*
Yellow warbler	*Dendroica petechia*
Fish	
none	
Invertebrates	
Saltpan fiddler	*Uca burgersi*
Damselfly larvae	unknown species
Plants (associated with the ECA [inland] Lagoon)	
Red mangrove	*Rhizophora mangle*
Black mangrove	*Avicennia germinans*
Seaside purslane	*Sesuvium portulacastrum*
Widgeon grass	*Ruppia maritima*
Seashore dropseed	*Sporobolus virginicus*

TABLE L-3
Animals and Plants Observed at the ECA
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Common Name	Scientific Name
Plants (generally associated with upland habitats[a])	
Espinosa; Prickly bush	*Oplonia spinosa*
none	*Celosia nitida*
Chicharrón; Cock´s spur	*Comocladia dodonaea*
Bejuco lechoso	*Echites agglutinatus*
Babeiro amarillo	*Pentalinon luteum*
Alhelí; Milk tree	*Plumeria alba*
Cachimbo de leche; Milk bush	*Rauvolfia nitida*
Palma de escoba; Pandereta	*Thrinax morrisii*
none	*Metastelma decipiens*
none	*Baccharis dioica*
Clavelón de playa; Sea ox-eye	*Borrichia arborescens*
Cariaquillo: Bitter bush	*Chromolaena sinuata*
Salaíllo	*Melanthera aspera*
Yerba de San Juan	*Pectis humifusa*
Pancha, San Juan del monte; Tridax	*Tridax procumbens*
Margarita de las rocas	*Wedelia calycina*
Liana fragante	*Distictis lactiflora*
Roble nativo	*Tabebuia heterophylla*
Nigua de playa; Bay lavander	*Argusia gnaphalodes*
Palo de vaca; Pigeon berry	*Bourreria succulenta*
Palo de lija; Sand-paper tree	*Cordia ricksecker*i
Cotorra de playa; Seaside heliotrope	*Heliotropium curassavicum*
Nigüita	*Tournefortia microphylla*
Mostacilla; Sea-rocket	*Cakile lanceolata*
Nido de gungulén; Bunch moss	*Tillandsia recurvata*
Almácigo	*Bursera simaruba*
Melón de costa; Turk´s cap	*Melocactus intortus*
Higo de mar; Prickly pear	*Opuntia dillenii*
Dildo; Organ pipe	*Pilosocereus royenii*
Barbasco; Canelle	*Canella winteriana*
Bejuco inglés; Black wattle	*Capparis cynophallophora*
Palinguán; Caper tree	*Capparis flexuosa*
Sapo prieto; Linguam	*Capparis indica*
Coscorrón; Marble-tree	*Cassine xylocarpa*
Coral; Poison cherry	*Crossopetalum rhacoma*
Araña; False boxwood	*Gyminda latifolia*
Alfilerillo; Bois flamant	*Maytenus laevigata*
Cafeíllo; Florida boxwood	*Schaefferia frutescens*
Guayabacoa, Palo de cruz	*Garcinia portoricensis*
Úcar	*Bucida buceras*
Mangle botón; Botton tree	*Conocarpus erecta*

TABLE L-3
Animals and Plants Observed at the ECA
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Common Name	Scientific Name
Cohitre; Blue day flower	*Commelina diffusa*
Bejuco de Mona; Dodder	*Cuscuta americana*
none	*Evolvulus convolvuloides*
none	*Evolvulus sericeus*
Bejuco playero; Bay hops	*Ipomoea pes–caprae*
Bejuquillo guitarra; Guitar-vine	*Ipomoea steudelii*
Bejuco de luna; Coast moon-vine	*Ipomoea violacea*
Aguinaldo de costa	*Jacquemontia havanensis*
Aguinaldo azul	*Jacquemontia pentanthos*
Batatilla blanca	*Merremia quinquefolia*
none	*Bulbostylis pauciflora*
none	*Cyperus sp.*
none	*Scleria lithosperma*
Escambrón	*Adelia ricinella*
Plateada	*Argythamnia candicans*
Lechoso; Little red devil, Bush spurge	*Chamaesyce articulata*
Lecherito de costa	*Chamaesyce messembryanthemifolia*
Lecherita	*Chamaesyce turpinii*
Maná	*Croton astroites*
none	*Croton betulinus*
Lechecillo	*Croton discolor*
Indio desnudo; Manchineel berry	*Euphorbia petiolaris*
Yaití; Ramón; Crabwood	*Gymnanthes lucida*
Manzanillo; Manchineel	*Hippomane mancinella*
Higuereta cimarrona	*Jatropha gossypiifolia*
Yerba Rosario	*Aeschynomene americana*
Bosborin; Ink berry	*Scaevola plumieri*
Bejuco dorado; Love vine	*Cassytha filiformis*
Haba de San Antonio; Gray nickers	*Caesalpinia bonduc*
Mato amarillo; Yellow nickers	*Caesalpinia ciliata*
Mato de Culebra	*Caesalpinia culebrae*
none	*Chamaecrista portoricensis*
Canavalia; Bay-bean	*Canavalia rosea*
Conchita de Virginia	*Centrosema virginianum*
Maraimaray	*Dalbergia ecastaphyllum*
Frijolillo de monte	*Rhynchosia reticulata*
Zarzabacoa enana; Pencil flower	*Stylosanthes hamata*
Añil cenizo	*Tephrosia cinerea*
Frijolillo	*Teramnus labialis*
Casia; Twisted acacia	*Acacia tortuosa*
Acacia pálida; Wild tamarind	*Leucaena leucocephala*
Zarza; Black amaret	*Mimosa ceratonia*

TABLE L-3
Animals and Plants Observed at the ECA
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Common Name	Scientific Name
Escambrón colorado; Black bean	*Pithecellobium unguis-cati*
Mesquite	*Prosopis juliflora*
Bejuco de San Pedro	*Stigmaphyllon emarginatum*
Aceituna; Candle berry	*Byrsonima lucida*
Algodón; Wild cotton	*Gossypium barbadense*
Emajagüilla; Cork tree	*Thespesia populnea*
Jagüeillo; Boislaglu	*Ficus citrifolia*
Grajo; Krum-berry	*Eugenia axillaris*
Hoja menuda; Black rod-wood	*Eugenia biflora*
Anhuila; Spanish stopper	*Eugenia foetida*
Birijí; Black cherry	*Eugenia monticola*
Corcho blanco; Water mampoo	*Pisonia subcordata*
Araña	*Schoepfia obovata*
Ciruelo de la Florida; Florida plum	*Ximenia americana*
Florida privet, Ink-bush	*Forestiera segregata*
Cañuela de costa: Mac Connell's orchid	*Psychilis macconnelliae*
Flor de pasión	*Passiflora suberosa*
Carmín; Cat´s blood	*Rivina humilis*
Huracán; Hurricane grass	*Bothriochloa pertusa*
Abrojo; Bur grass	*Cenchrus echinatus*
Horquetilla morada; Blue grass	*Chloris inflata*
Yerba de dedo; Finger grass	*Chloris petraea*
Grama de costa; Plush-grass	*Chloris radiata*
Matojo de arena	*Paspalum laxum*
Yerba de sal; Salt grass	*Spartina patens*
Pelo de burro	*Sporobolus jacquemontii*
Lágrima de San Pedro	*Uniola virgata*
Uverita playera	*Coccoloba krugii*
none	*Coccoloba krugii x C. uvifera*
Uverillo	*Coccoloba microstachya*
Uva de playa; Sea grape	*Coccoloba uvifera*
Abeyuelo, Sanguinaria; Greenheart	*Colubrina arborescens*
Catire; Naked wood	*Colubrina elliptica*
Bariaco; Black iron-wood	*Krugiodendron ferreum*
Cascarroya	*Reynosia uncinata*
Azufaifo, Cascarilla	*Ziziphus reticulata*
Boje, Quina	*Antirhea acutata*
none	*Catesbaea parviflora*
Jayajabico; Black torch	*Erithalis fruticosa*
none	*Ernodea littoralis*
Albarillo; Prince-wood	*Exostema caribaeum*
Cucubano liso; Velvet seed	*Guettarda elliptica*

TABLE L-3
Animals and Plants Observed at the ECA
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Common Name	Scientific Name
Gardenia hedionda; Indian mulberry	*Morinda citrifolia*
Tintillo; Ink-berry	*Randia aculeata*
Lirio	*Strumpfia maritima*
Cuabilla	*Amyris elemifera*
Aceitillo; Yellow sander	*Zanthoxylum flavum*
Quenepa; Ginep	*Melicoccus bijugatus*
Alquitrán; Break hill	*Sideroxylon obovatum*
Té del país; Goat weed	*Capraria biflora*
Berenjena de playa; Rubia	*Solanum persicifolium*
Cuernecillo; Cowbush	*Helicteres jamaicensis*
Bretónica prieta	*Melochia nodiflora*
Bretónica piramidal	*Melochia pyramidata*
Bretónica afelpada	*Melochia tomentosa*
Basora prieta, Malvavisco	*Waltheria indica*
Azúcares	*Jacquinia arborea*
Mercocha	*Jaquinia berterii*
Malvaté	*Corchorus hirsutus*
Escoba blanca	*Corchorus siliquosus*
Damiana	*Turnera diffusa*
Palo de guitarra; Old woman bitter	*Citharexylum fruticosum*
Botón de oro; Crab prickly	*Clerodendron aculeatum*
Santa María; Button sage	*Lantana involucrata*
Bretónica	*Stachytarpheta jamaicensis*
Bretónica de costa	*Stachytarpheta strigosa*
Caro costero	*Cissus trifoliata*
Guayacán; Lignum vitae	*Guaiacum officinale*

a - Source: Geo-Marine (2007)

TABLE L-4
Federally Listed Species Occurring or Potentially Occurring at NASD Vieques
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Scientific Name (Common Name)	Federal Status
Plants	
Chaemacrista glandulosa var. mirabilis (Herb)	Endangered
Stahlia monosperma (Cobana negra)	Threatened
Calyptranthes thomasiana (Thomas' lidflower)	Endangered
Eugenia woodburyana (Evergreen tree)	Endangered
Goetzea elegans	Endangered
Reptiles and Amphibians	
Chelonia mydas (Green sea turtle)	Threatened
Dermochelys coriacea (Leatherback sea turtle)	Endangered
Eretmochelys imbricata (Hawksbill sea turtle)	Endangered
Caretta caretta (Loggerhead sea turtle)	Threatened
Birds	
Sterna dougalli dougalli (Roseate tern)	Threatened
Mammals	
Physeter macrocephalus (Sperm whale)	Endangered
Megaptera novaeangliae (Humpback whale)	Endangered
Trichechus manatus (West Indian manatee)	Endangered

Source: Vieques Integrated Natural Resource Plan, Plan Years 2003 - 2012 (Geo-Marine 2003)

TABLE L-5
Samples Used in the Ecological Risk Assessment
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Sample ID	Date	Sampled Depth Range (feet)
Surface Water - ECA Lagoon			
VEECA-5SW01	VEECA-5SW01-0211	2/9/2011	--
VEECA-5SW02	VEECA-5SW02-0211	2/9/2011	--
VEECA-5SW02	VEECA-5SW02P-0211	2/9/2011	--
VEECA-5SW03	VEECA-5SW03-0211	2/9/2011	--
VEECA-5SW04	VEECA-5SW04-0211	2/9/2011	--
VEECA-5SW05	VEECA-5SW05-0211	2/9/2011	--
Sediment - ECA Lagoon			
VEECA-5SD01	VEECA-5SD01-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD02	VEECA-5SD02-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD02	VEECA-5SD02P-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD03	VEECA-5SD03-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD04	VEECA-5SD04-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD05	VEECA-5SD05-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD06	VEECA-5SD06-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD07	VEECA-5SD07-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD08	VEECA-5SD08-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD09	VEECA-5SD09-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD10	VEECA-5SD10-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD11	VEECA-5SD11-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD11	VEECA-5SD11P-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD12	VEECA-5SD12-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD13	VEECA-5SD13-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD14	VEECA-5SD14-000H-0211	2/10/2011	0 - 0.5
VEECA-5SD15	VEECA-5SD15-000H-0211	2/10/2011	0 - 0.5
SMI Samples - ECA Upland Areas			
Beach Decision Unit			
VEECA-1DU01	VEECA-1SMI01-0211	2/7/2011	0 - 0.17
VEECA-1DU01	VEECA-1SMI01T-0211	2/7/2011	0 - 0.17
VEECA-1DU01	VEECA-1SMI01TT-0211	2/7/2011	0 - 0.17
VEECA-1DU02	VEECA-1SMI02-0211	2/7/2011	0 - 0.17
Lowland Decision Unit			
VEECA-2DU01	VEECA-2SMI01-0211	2/4/2011	0 - 0.17
VEECA-2DU02	VEECA-2SMI02-0211	2/14/2011	0 - 0.17
VEECA-2DU03	VEECA-2SMI03-0211	2/7/2011	0 - 0.17
VEECA-2DU04	VEECA-2SMI04-0211	2/7/2011	0 - 0.17
VEECA-2DU05	VEECA-2SMI05-0211	2/7/2011	0 - 0.17
Lagoon Fringe Decision Unit			
VEECA-3DU01	VEECA-3SMI01-0211	2/14/2011	0 - 0.17
VEECA-3DU02	VEECA-3SMI02-0211	2/14/2011	0 - 0.17
VEECA-3DU03	VEECA-3SMI03-0211	2/14/2011	0 - 0.17
VEECA-3DU04	VEECA-3SMI04-0211	2/14/2011	0 - 0.17
VEECA-3DU04	VEECA-3SMI04T-0211	2/14/2011	0 - 0.17
VEECA-3DU04	VEECA-3SMI04TT-0211	2/14/2011	0 - 0.17
VEECA-3DU05	VEECA-3SMI05-0211	2/14/2011	0 - 0.17
Upland Decision Unit			
VEECA-4DU01	VEECA-4SMI01-0211	2/2/2011	0 - 0.17
VEECA-4DU02	VEECA-4SMI02-0211	2/2/2011	0 - 0.17
VEECA-4DU02	VEECA-4SMI02T-0211	2/2/2011	0 - 0.17

TABLE L-5
Samples Used in the Ecological Risk Assessment
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Station ID	Sample ID	Date	Sampled Depth Range (feet)
VEECA-4DU02	VEECA-4SMI02TT-0211	2/2/2011	0 - 0.17
VEECA-4DU03	VEECA-4SMI03-0211	2/7/2011	0 - 0.17
VEECA-4DU04	VEECA-4SMI04-0211	2/15/2011	0 - 0.17
VEECA-4DU05	VEECA-4SMI05-0211	2/7/2011	0 - 0.17
VEECA-4DU06	VEECA-4SMI06-0211	2/15/2011	0 - 0.17
VEECA-4DU07	VEECA-4SMI07-0211	2/15/2011	0 - 0.17
VEECA-4DU08	VEECA-4SMI08-0211	2/14/2011	0 - 0.17
VEECA-4DU09	VEECA-4SMI09-0211	2/15/2011	0 - 0.17
VEECA-4DU09	VEECA-4SMI09T-0211	2/15/2011	0 - 0.17
VEECA-4DU09	VEECA-4SMI09TT-0211	2/15/2011	0 - 0.17
VEECA-4DU10	VEECA-4SMI10-0211	2/15/2011	0 - 0.17
VEECA-4DU11	VEECA-4SMI11-0211	2/3/2011	0 - 0.17
VEECA-4DU11	VEECA-4SMI11T-0211	2/3/2011	0 - 0.17
VEECA-4DU11	VEECA-4SMI11TT-0211	2/3/2011	0 - 0.17
VEECA-4DU12	VEECA-4SMI12-0211	2/4/2011	0 - 0.17
VEECA-4DU13	VEECA-4SMI13-0211	2/3/2011	0 - 0.17
VEECA-4DU14	VEECA-4SMI14-0211	2/3/2011	0 - 0.17
VEECA-4DU15	VEECA-4SMI15-0211	2/3/2011	0 - 0.17
Discrete Samples - Upland Areas			
Lagoon Fringe Decision Unit			
VEECA-3SB01	VEECA-3SB01-0001-0211	2/11/2011	0.17 - 1
VEECA-3SB02	VEECA-3SB02-0001-0211	2/11/2011	0.17 - 1
VEECA-3SB02	VEECA-3SB02P-0001-0211	2/11/2011	0.17 - 1
VEECA-3SB03	VEECA-3SB03-0002-0211	2/10/2011	0.17 - 2
VEECA-3SB04	VEECA-3SB04-001H-0211	2/14/2011	0.17 - 1.5
VEECA-3SB05	VEECA-3SB05-0002-0211	2/10/2011	0.17 - 2
Beach Decision Unit			
VEECA-1SB01	VEECA-1SB01-1H02-0211	2/8/2011	1.5 - 2
VEECA-1SB02	VEECA-1SB02-1H02-0211	2/8/2011	1.5 - 2
VEECA-1SB02	VEECA-1SB02P-1H02-0211	2/8/2011	1.5 - 2
Upland Decision Unit			
VEECA-4SB01	VEECA-4SB01-001H-0211	2/18/2011	0.17 - 1.5
Background Incremental Samples			
VEECA-6DU01	VEECA-6SMI01-0211	2/16/2011	0 - 0.17
VEECA-6DU02	VEECA-6SMI02-0211	2/16/2011	0 - 0.17
VEECA-6DU02	VEECA-6SMI02T-0211	2/16/2011	0 - 0.17
VEECA-6DU02	VEECA-6SMI02TT-0211	2/16/2011	0 - 0.17
VEECA-6DU03	VEECA-6SMI03-0211	2/16/2011	0 - 0.17
VEECA-6DU04	VEECA-6SMI04-0211	2/17/2011	0 - 0.17
VEECA-6DU05	VEECA-6SMI05-0211	2/17/2011	0 - 0.17
VEECA-6DU06	VEECA-6SMI06-0211	2/17/2011	0 - 0.17
VEECA-6DU07	VEECA-6SMI07-0211	2/17/2011	0 - 0.17
VEECA-6DU08	VEECA-6SMI08-0211	2/17/2011	0 - 0.17
VEECA-6DU09	VEECA-6SMI09-0211	2/17/2011	0 - 0.17
VEECA-6DU10	VEECA-6SMI10-0211	2/17/2011	0 - 0.17

Shaded cells indicate field duplicates

TABLE L-6
Physical Parameter Measurements - Surface Soil
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Area	Decision Unit	Sample ID	Date	Total Organic Carbon mg/kg	Total Organic Carbon percent	pH
SMI - Beach	1	VEECA-1SMI01-0211	2/7/2011	NS	NS	7.90
SMI - Beach	1	VEECA-1SMI02-0211	2/7/2011	NS	NS	7.70
SMI - Lowland	2	VEECA-2SMI01-0211	2/4/2011	NS	NS	7.70
SMI - Lowland	2	VEECA-2SMI02-0211	2/14/2011	NS	NS	7.80
SMI - Lowland	2	VEECA-2SMI03-0211	2/7/2011	NS	NS	7.80
SMI - Lowland	2	VEECA-2SMI04-0211	2/7/2011	NS	NS	8.00
SMI - Lowland	2	VEECA-2SMI05-0211	2/7/2011	NS	NS	8.00
SMI - Lagoon Fringe	3	VEECA-3SMI01-0211	2/14/2011	NS	NS	7.60
SMI - Lagoon Fringe	3	VEECA-3SMI02-0211	2/14/2011	NS	NS	7.90
SMI - Lagoon Fringe	3	VEECA-3SMI03-0211	2/14/2011	NS	NS	7.70
SMI - Lagoon Fringe	3	VEECA-3SMI04-0211	2/14/2011	NS	NS	7.80
SMI - Lagoon Fringe	3	VEECA-3SMI05-0211	2/14/2011	NS	NS	7.70
SMI - Upland	4	VEECA-4SMI01-0211	2/2/2011	NS	NS	7.60
SMI - Upland	4	VEECA-4SMI02-0211	2/2/2011	NS	NS	8.10
SMI - Upland	4	VEECA-4SMI03-0211	2/7/2011	NS	NS	7.90
SMI - Upland	4	VEECA-4SMI04-0211	2/15/2011	NS	NS	7.90
SMI - Upland	4	VEECA-4SMI05-0211	2/7/2011	NS	NS	8.00
SMI - Upland	4	VEECA-4SMI06-0211	2/15/2011	NS	NS	8.10
SMI - Upland	4	VEECA-4SMI07-0211	2/15/2011	NS	NS	8.10
SMI - Upland	4	VEECA-4SMI08-0211	2/14/2011	NS	NS	8.20
SMI - Upland	4	VEECA-4SMI09-0211	2/15/2011	NS	NS	7.90
SMI - Upland	4	VEECA-4SMI10-0211	2/15/2011	NS	NS	8.10
SMI - Upland	4	VEECA-4SMI11-0211	2/3/2011	NS	NS	8.00
SMI - Upland	4	VEECA-4SMI12-0211	2/4/2011	NS	NS	7.90
SMI - Upland	4	VEECA-4SMI13-0211	2/3/2011	NS	NS	8.00
SMI - Upland	4	VEECA-4SMI14-0211	2/3/2011	NS	NS	7.60
SMI - Upland	4	VEECA-4SMI15-0211	2/3/2011	NS	NS	8.00
Discrete - Beach	1	VEECA-1SB01-1H02-0211	2/8/2011	NS	NS	8.80
Discrete - Beach	1	VEECA-1SB02-1H02-0211	2/8/2011	NS	NS	NS
Discrete - Lagoon Fringe	3	VEECA-3SB01-0001-0211	2/11/2011	NS	NS	7.90
Discrete - Lagoon Fringe	3	VEECA-3SB02-0001-0211	2/11/2011	NS	NS	7.90
Discrete - Lagoon Fringe	3	VEECA-3SB03-0002-0211	2/10/2011	NS	NS	7.70
Discrete - Lagoon Fringe	3	VEECA-3SB04-001H-0211	2/14/2011	NS	NS	7.70
Discrete - Lagoon Fringe	3	VEECA-3SB05-0002-0211	2/10/2011	NS	NS	7.90
Discrete - Upland	4	VEECA-4SB01-001H-0211	2/18/2011	NS	NS	8.10

NS - Not Sampled

TABLE L-7
Assessment Endpoints, Risk Hypotheses, and Measurement Endpoints
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Assessment Endpoint	Risk Hypothesis	Measurement Endpoint	Receptor
Terrestrial Habitats			
Survival, growth, and reproduction of terrestrial soil invertebrate communities	Are site-related chemical concentrations in surface soil sufficient to adversely effect soil invertebrate communities?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface soil with soil screening values; soil samples from a depth of 2 - up to 24 inches are used for land crab exposures	Soil invertebrates
Survival, growth, and reproduction of terrestrial plant communities	Are site-related chemical concentrations in surface soil sufficient to adversely effect terrestrial plant communities?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface soil with soil screening values	Terrestrial plants
Survival, growth, and reproduction of terrestrial reptile populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to terrestrial reptile populations?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface soil with soil screening values; soil samples from a depth of 18 - 24 inches are used for turtle egg exposures Evidence of potential risk to other upper trophic level terrestrial receptors evaluated in the ERA (birds and mammals used as surrogates)	Reptiles
Survival, growth, and reproduction of avian terrestrial invertivore (SERA)/ omnivore (BERA) populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume soil invertebrates (SERA) or terrestrial plants and soil invertebrates (BERA) from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Pearly-eyed thrasher
Survival, growth, and reproduction of avian terrestrial herbivore populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume terrestrial plants from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Common ground dove
Survival, growth, and reproduction of avian aerial insectivore populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume soil invertebrates from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Cave swallow

TABLE L-7
Assessment Endpoints, Risk Hypotheses, and Measurement Endpoints
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Assessment Endpoint	Risk Hypothesis	Measurement Endpoint	Receptor
Survival, growth, and reproduction of avian terrestrial carnivore populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume small mammals from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Red-tailed hawk
Survival, growth, and reproduction of mammalian terrestrial herbivore (SERA)/ omnivore (BERA) populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume terrestrial plants (SERA) or terrestrial plants and soil invertebrates (BERA) from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Norway rat
Survival, growth, and reproduction of mammalian terrestrial invertivore (SERA)/ omnivore (BERA) populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume soil invertebrates (SERA) or small mammals, soil invertebrates, and terrestrial plants (BERA) from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Indian mongoose
Survival, growth, and reproduction of mammalian herbivore populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume plants from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Fruit bat
Survival, growth, and reproduction of mammalian aerial insectivore populations	Are site-related chemical concentrations in surface soil sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume soil invertebrates from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface soil concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Velvet free-tailed Bat
Aquatic Habitats			
Survival, growth, and reproduction of benthic invertebrate communities	Are site-related chemical concentrations in surface water and surface sediment sufficient to adversely effect benthic invertebrate communities?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface water and sediment with medium-specific screening values	Benthic invertebrates

TABLE L-7
Assessment Endpoints, Risk Hypotheses, and Measurement Endpoints
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Assessment Endpoint	Risk Hypothesis	Measurement Endpoint	Receptor
Survival, growth, and reproduction of aquatic plant communities	Are site-related chemical concentrations in surface water and surface sediment sufficient to adversely affect aquatic plant communities?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface water and sediment with medium-specific screening values	Aquatic plants
Survival, growth, and reproduction of fish communities	Are site-related chemical concentrations in surface water and surface sediment sufficient to adversely effect fish communities?	Comparison of maximum (SERA) and mean (BERA) chemical concentrations in surface water and sediment with medium-specific screening values	Fish
Survival, growth, and reproduction of avian aquatic invertivore populations	Are site-related chemical concentrations in surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume benthic invertebrates from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Spotted sandpiper
Survival, growth, and reproduction of avian aquatic piscivore (SERA)/ piscivore/invertivore (BERA) populations	Are site-related chemical concentrations in surface water and surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume fish and invertebrates from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Green heron
Survival, growth, and reproduction of avian aquatic herbivore (SERA)/ herbivore/invertivore (BERA) populations	Are site-related chemical concentrations in surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume aquatic plants and invertebrates from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	White-cheeked pintail
Survival, growth, and reproduction of avian aerial insectivore populations	Are site-related chemical concentrations in surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to avian receptor populations that may consume benthic invertebrates emerging from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Cave swallow

TABLE L-7
Assessment Endpoints, Risk Hypotheses, and Measurement Endpoints
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Assessment Endpoint	Risk Hypothesis	Measurement Endpoint	Receptor
Survival, growth, and reproduction of mammalian aerial insectivore populations	Are site-related chemical concentrations in surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume invertebrates emerging from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Velvet free-tailed Bat
Survival, growth, and reproduction of mammalian aquatic piscivore populations	Are site-related chemical concentrations in surface water and surface sediment sufficient to cause adverse effects (on growth, survival, or reproduction) to mammalian receptor populations that may consume fish from the site?	Comparison of modeled dietary intakes using maximum (SERA) and mean (BERA) surface sediment concentrations with literature-based ingestion TRVs; maximum HQs >1 based upon the NOAEL (SERA) and mean HQs >1 based upon the MATC (BERA) indicate an effect	Fishing bat

TABLE L-8
Bioaccumulative Chemicals List and Log K_{ow} Values
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Log K_{ow} Range	Selected log K_{ow}	Reference
Metals			
Antimony[1]	-- - --	--	--
Arsenic	-- - --	--	--
Barium[1]	-- - --	--	--
Beryllium[1]	-- - --	--	--
Cadmium	-- - --	--	--
Chromium[2]	-- - --	--	--
Cobalt[1]	-- - --	--	--
Copper	-- - --	--	--
Lead	-- - --	--	--
Manganese[1]	-- - --	--	--
Mercury[3]	-- - --	--	--
Nickel	-- - --	--	--
Selenium	-- - --	--	--
Silver	-- - --	--	--
Vanadium[1]	-- - --	--	--
Zinc	-- - --	--	--
Polychlorinated Biphenyls[4]			
Aroclor-1016	Not reported	5.60	Sample et al. 1996
Aroclor-1221	Not reported	4.70	Jones et al. 1997
Aroclor-1232	Not reported	5.10	Jones et al. 1997
Aroclor-1242	Not reported	5.60	Jones et al. 1997
Aroclor-1248	Not reported	6.20	Jones et al. 1997
Aroclor-1254	Not reported	6.50	Jones et al. 1997
Aroclor-1260	Not reported	6.80	Jones et al. 1997
Pesticides			
4,4'-DDD	5.90 - 6.65	6.10	USEPA 1995a
4,4'-DDE	5.63 - 6.96	6.76	USEPA 1995a
4,4'-DDT	5.56 - 7.01	6.53	USEPA 1995a
Aldrin	5.11 - 7.50	6.50	USEPA 1995a
alpha-BHC	3.75 - 3.81	3.80	USEPA 1995a
alpha-Chlordane[5]	5.80 - 6.41	6.32	USEPA 1995a
beta-BHC	3.75 - 3.84	3.81	USEPA 1995a
delta-BHC	Not reported	4.10	USEPA 1996b
Dieldrin	3.63 - 6.20	5.37	USEPA 1995a
Endosulfan I	3.55 - 3.85	3.83	USEPA 1995a
Endosulfan II	3.62 - 4.52	4.52	USEPA 1995a
Endrin	2.92 - 5.20	5.06	USEPA 1995a
gamma-BHC (Lindane)	3.61 - 3.90	3.73	USEPA 1995a
gamma-Chlordane[5]	5.80 - 6.41	6.32	USEPA 1995a
Heptachlor	4.93 - 6.26	6.26	USEPA 1995a
Heptachlor epoxide	3.50 - 5.40	5.00	USEPA 1995a
Methoxychlor	4.20 - 5.60	5.08	USEPA 1995a
Toxaphene	4.33 - 5.56	5.50	USEPA 1995a

TABLE L-8
Bioaccumulative Chemicals List and Log K_{ow} Values
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Log K_{ow} Range	Selected log K_{ow}	Reference
Volatile and Semivolatile Organic Compounds			
1,1,2,2-Tetrachloroethane[6]	2.31 - 2.64	2.39	USEPA 1995a
1,2,4,5-Tetrachlorobenzene	4.51 - 4.83	4.64	USEPA 1995a
1,2,4-Trichlorobenzene	3.89 - 4.23	4.01	USEPA 1995a
1,2-Dichlorobenzene	3.20 - 3.61	3.43	USEPA 1995a
1,3-Dichlorobenzene	Not reported	3.50	USEPA 1996b
1,4-Dichlorobenzene	3.26 - 3.62	3.42	USEPA 1995a
4-Bromophenyl-phenylether	4.89 - 5.24	5.00	USEPA 1995a
4-Chlorophenyl-phenylether	4.08 - 5.09	4.95	USEPA 1995a
Acenaphthene	3.77 - 4.49	3.92	USEPA 1995a
Acenaphthylene	Not reported	4.10	USEPA 1996b
Anthracene	4.44 - 4.80	4.55	USEPA 1995a
Benzo(a)anthracene	5.61 - 5.79	5.70	USEPA 1995a
Benzo(a)pyrene	5.98 - 6.34	6.11	USEPA 1995a
Benzo(b)fluoranthene	5.79 - 6.40	6.20	USEPA 1995a
Benzo(g,h,i)perylene	6.58 - 7.05	6.70	USEPA 1995a
Benzo(k)fluoranthene	6.12 - 6.27	6.20	USEPA 1995a
Chrysene	5.41 - 5.79	5.70	USEPA 1995a
Dibenz(a,h)anthracene	6.50 - 6.88	6.69	USEPA 1995a
Fluoranthene	4.84 - 5.39	5.12	USEPA 1995a
Fluorene	4.04 - 4.40	4.21	USEPA 1995a
Hexachlorobenzene	5.23 - 6.92	5.89	USEPA 1995a
Hexachlorobutadiene	4.74 - 5.16	4.81	USEPA 1995a
Hexachlorocyclopentadiene	5.05 - 5.51	5.39	USEPA 1995a
Hexachloroethane	3.82 - 4.14	4.00	USEPA 1995a
Indeno(1,2,3-cd)pyrene	6.58 - 6.72	6.65	USEPA 1995a
Pentachlorophenol	5.01 - 5.24	5.09	USEPA 1995a
Phenanthrene	4.37 - 4.57	4.55	USEPA 1995a
Pyrene	4.76 - 5.52	5.11	USEPA 1995a
Explosives[7]			
1,3,5-Trinitrobenzene[1]	1.18 - 1.37	1.18	USEPA 1995a
2,4,6-Trinitrotoluene[1]	1.60 - 2.70	2.09	Talmage et al. 1999
HMX[1]	0.06 - 0.26	0.15	Talmage et al. 1999
Nitrobenzene[1]	1.70 - 2.12	1.84	USEPA 1995a
Perchlorate[1]	-- - --	--	--

[1] Terrestrial habitats (soils) only (see text)

[2] Listed as chromium VI but applied to total chromium

[3] Listed as methylmercury but applied to total mercury

[4] PCB congeners 8, 18, 28, 44, 52, 66, 77, 81, 101, 105, 118, 126, 128, 138, 153, 156, 169, 170, 180, 187, 195, 206, and 209 are also listed in USEPA (2000)

[5] Listed as "chlordane"

[6] Listed as "tetrachloroethane"

[7] Not on bioaccumulative chemicals list but detected explosives were also evaluated

TABLE L-9
Soil Bioconcentration Factors For Plants (Dry Weight)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Screening (Step 2)			Baseline (Step 3A)		
	Value	Basis	Reference	Value	Basis	Reference
Metals						
Antimony	0.011	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Arsenic	1.103	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Barium	0.477	90th percentile	Bechtel Jacobs 1998a	0.154	Geometric mean	Bechtel Jacobs 1998a
Beryllium	0.010	Geometric mean	Baes et al. 1984	--	see Table L-10	--
Cadmium	3.250	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Chromium	0.084	90th percentile	Bechtel Jacobs 1998a	0.041	Median	Bechtel Jacobs 1998a; USEPA 2007f
Cobalt	0.025	90th percentile	Bechtel Jacobs 1998a	0.008	Geometric mean	Bechtel Jacobs 1998a
Copper	0.625	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Lead	0.468	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Manganese	0.234	90th percentile	Bechtel Jacobs 1998a	0.081	Geometric mean	Bechtel Jacobs 1998a
Mercury	5.000	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Nickel	1.411	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Selenium	3.012	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Silver	0.037	90th percentile	Bechtel Jacobs 1998a	0.014	Median	Bechtel Jacobs 1998a; USEPA 2007f
Vanadium	0.010	90th percentile	Bechtel Jacobs 1998a	0.005	Geometric mean	Bechtel Jacobs 1998a
Zinc	1.820	90th percentile	Bechtel Jacobs 1998a	--	see Table L-10	--
Explosives						
1,3,5-Trinitrobenzene	1.00	Assumed	--	1.00	Assumed	--
2,4,6-Trinitrotoluene	4.23	Median	USEPA 2007f	4.23	Median	USEPA 2007f
HMX	2.20	Maximum	Johnson et al. 2009	0.56	Mean	Johnson et al. 2009
Nitrobenzene	1.00	Assumed	--	1.00	Assumed	--
Perchlorate	80.0	Maximum	USEPA 2002	41.0	Midpoint	USEPA 2002

TABLE L-10
Bioconcentration/Bioaccumulation Factor Models (Dry Weight)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Plants[1]	Reference	Soil Invertebrates[2]	Reference	Small Mammal Omnivores[3]	Reference	Benthic Invertebrates[4]	Reference
Metals								
Antimony	$C_p = e^{(-3.233 + 0.938(\ln Cs))}$	USEPA 2007f	--	--	--	--	--	--
Arsenic	$C_p = e^{(-1.992 + 0.564(\ln Cs))}$	Bechtel Jacobs 1998a	$C_w = e^{(-1.421 + 0.706(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	$C_m = e^{(-4.5796 + 0.7354(\ln Cs))}$	Sample et al. 1998b	$C_i = 10^{(-0.292 + 0.754(\log Csd))}$	Bechtel Jacobs 1998b
Beryllium	$C_p = e^{(-0.5361 + 0.7345(\ln Cs))}$	USEPA 2007f	--	--	--	--	--	--
Cadmium	$C_p = e^{(-0.476 + 0.546(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	$C_w = e^{(2.114 + 0.795(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	$C_m = e^{(-1.5383 + 0.5660(\ln Cs))}$	Sample et al. 1998b	$C_i = 10^{(-0.314 + 0.513(\log Csd))}$	Bechtel Jacobs 1998b
Chromium	--	--	--	--	$C_m = e^{(-1.4945 + 0.7326(\ln Cs))}$	Sample et al. 1998b	$C_i = 10^{(0.2092 + 0.365(\log Csd))}$	Bechtel Jacobs 1998b
Cobalt	--	--	--	--	$C_m = e^{(-4.4669 + 1.3070(\ln Cs))}$	Sample et al. 1998b; USEPA 2007f	--	--
Copper	$C_p = e^{(0.669 + 0.394(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	$C_w = e^{(1.675 + 0.264(\ln Cs))}$	Sample et al. 1998a	$C_m = e^{(1.4592 + 0.2681(\ln Cs))}$	Sample et al. 1998b	--	--
Lead	$C_p = e^{(-1.328 + 0.561(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	$C_w = e^{(-0.218 + 0.807(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	$C_m = e^{(0.0761 + 0.4422(\ln Cs))}$	Sample et al. 1998b; USEPA 2007f	$C_i = 10^{(-0.515 + 0.653(\log Csd))}$	Bechtel Jacobs 1998b
Manganese	--	--	$C_w = e^{(-0.809 + 0.682(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	--	--	--	--
Mercury	$C_p = e^{(-0.996 + 0.544(\ln Cs))}$	Bechtel Jacobs 1998a	--	--	--	--	--	--
Nickel	$C_p = e^{(-2.224 + 0.748(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	--	--	$C_m = e^{(-0.2462 + 0.4658(\ln Cs))}$	Sample et al. 1998b; USEPA 2007f	$C_i = 10^{(-0.440 + 0.695(\log Csd))}$	Bechtel Jacobs 1998b
Selenium	$C_p = e^{(-0.678 + 1.104(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	$C_w = e^{(-0.075 + 0.733(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	$C_m = e^{(-0.4158 + 0.3764(\ln Cs))}$	Sample et al. 1998b; USEPA 2007f	--	--
Zinc	$C_p = e^{(1.575 + 0.555(\ln Cs))}$	Bechtel Jacobs 1998a; USEPA 2007f	$C_w = e^{(4.449 + 0.328(\ln Cs))}$	Sample et al. 1998a; USEPA 2007f	$C_m = e^{(4.4713 + 0.0738(\ln Cs))}$	Sample et al. 1998b	$C_i = 10^{(1.89 + 0.126(\log Csd))}$	Bechtel Jacobs 1998b

[1] Where C_p = Concentration in aboveground portion of plant (mg/kg dry wt) and C_s = Concentration in soil (mg/kg dry wt)
[2] Where C_w = Concentration in earthworm (mg/kg dry wt) and C_s = Concentration in soil (mg/kg dry wt)
[3] Where C_m = Concentration in whole-body small mammal (mg/kg dry wt) and C_s = Concentration in soil (mg/kg dry wt)
[4] Where C_i = Concentration in benthic invertebrate (mg/kg dry wt) and C_{sd} = Concentration in sediment (mg/kg dry wt)

TABLE L-11
Soil Bioaccumulation Factors For Soil Invertebrates (Dry Weight)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Screening (Step 2)			Baseline (Step 3A)		
	Value	Basis	Reference	Value	Basis	Reference
Metals						
Antimony	1.000	Assumed	--	1.000	Assumed	--
Arsenic	0.523	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Barium	0.160	90th percentile	Sample et al. 1998a	0.060	Geometric mean	Sample et al. 1998a
Beryllium	1.182	90th percentile	Sample et al. 1998a	0.070	Geometric mean	Sample et al. 1998a
Cadmium	40.69	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Chromium	3.162	90th percentile	Sample et al. 1998a	0.320	Geometric mean	Sample et al. 1998a
Cobalt	0.291	90th percentile	Sample et al. 1998a	0.113	Geometric mean	Sample et al. 1998a
Copper	1.531	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Lead	1.522	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Manganese	0.124	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Mercury	20.63	90th percentile	Sample et al. 1998a	1.186	Geometric mean	Sample et al. 1998a
Nickel	4.730	90th percentile	Sample et al. 1998a	1.656	Arithmetic mean	Sample et al. 1998a
Selenium	1.340	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Silver	15.34	90th percentile	Sample et al. 1998a	2.045	Median	Sample et al. 1998a; USEPA 2007f
Vanadium	0.088	90th percentile	Sample et al. 1998a	0.039	Arithmetic mean	Sample et al. 1998a
Zinc	12.89	90th percentile	Sample et al. 1998a	--	see Table L-10	--
Explosives						
1,3,5-Trinitrobenzene	1.00	Assumed	--	1.00	Assumed	--
2,4,6-Trinitrotoluene	1.00	Assumed	--	1.00	Assumed	--
HMX	1.00	Maximum	Johnson et al. 2009	0.54	Mean	Johnson et al. 2009
Nitrobenzene	1.00	Assumed	--	1.00	Assumed	--
Perchlorate	1.00	Assumed	--	1.00	Assumed	--

TABLE L-12
Soil Bioaccumulation Factors For Small Mammals (Dry Weight) - Omnivores
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Screening (Step 2)			Baseline (Step 3A)		
	Value	Basis	Reference	Value	Basis	Reference
Metals						
Antimony	NA	--	See Section 1.3.3.3 (Small Mammals)	NA	--	See Section 1.3.3.3 (Small Mammals)
Arsenic	0.014	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Barium	0.069	90th percentile	Sample et al. 1998b	0.046	Median	Sample et al. 1998b
Beryllium	NA	--	See Section 1.3.3.3 (Small Mammals)	NA	--	See Section 1.3.3.3 (Small Mammals)
Cadmium	0.462	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Chromium	0.349	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Cobalt	0.025	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Copper	0.554	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Lead	0.286	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Manganese	0.037	90th percentile	Sample et al. 1998b	0.031	Median	Sample et al. 1998b
Mercury	0.130	90th percentile	Sample et al. 1998b	0.054	Median	Sample et al. 1998b
Nickel	0.589	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Selenium	1.263	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Silver	0.810	90th percentile	Sample et al. 1998b	0.151	Median	Sample et al. 1998b
Vanadium	0.013	90th percentile	Sample et al. 1998b	0.010	Median	Sample et al. 1998b
Zinc	2.782	90th percentile	Sample et al. 1998b	--	see Table L-10	--
Explosives						
1,3,5-Trinitrobenzene	0.0	Assumed	per USEPA 2007f for TNT/RDX	0.0	Assumed	per USEPA 2007f for TNT/RDX
2,4,6-Trinitrotoluene	0.0	Assumed	USEPA 2007f	0.0	Assumed	USEPA 2007f
HMX	0.0	Assumed	per USEPA 2007f for TNT/RDX	0.0	Assumed	per USEPA 2007f for TNT/RDX
Nitrobenzene	0.0	Assumed	per USEPA 2007f for TNT/RDX	0.0	Assumed	per USEPA 2007f for TNT/RDX
Perchlorate	0.0	Assumed	per USEPA 2007f for TNT/RDX	0.0	Assumed	per USEPA 2007f for TNT/RDX

NA - Not Available

TABLE L-13
Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Benthic Invertebrates
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Screening (Step 2)					
	BSAF (ww)	BAF (dw)[1]	Type	Principal Organisms	Basis	Reference
Metals						
Arsenic	--	0.690	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Cadmium	--	3.073	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Chromium	--	0.468	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Copper	--	7.957	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Lead	--	0.326	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Mercury	--	2.868	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Nickel	--	0.214	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b
Selenium	--	5.550	Marine	Molluscs	Average median	Thomann et al. 1995
Silver	--	0.180	Fresh	Oligochaete	Mean	Hirsch 1998
Zinc	--	4.759	Fresh	Invertebrate infauna	90th percentile	Bechtel Jacobs 1998b

[1] Wet-weight (ww) BSAFs are converted to dry-weight (dw) using the following values:

Lipids (%):	1.48	bivalves	2.58	macroinvertebrates	USACOE 2010
TOC (%):	1.52	Mean measured (ECA Lagoon)			
Percent soilds:	0.21	USEPA 1993			

TABLE L-13
Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Benthic Invertebrates
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Baseline (Step 3A)					
	BSAF (ww)	BAF (dw)[1]	Type	Principal Organisms	Basis	Reference
Metals						
Arsenic	--	--	--	--	see Table L-10	--
Cadmium	--	--	--	--	see Table L-10	--
Chromium	--	--	--	--	see Table L-10	--
Copper	--	0.824	Fresh	Invertebrate infauna	Geometric mean	Bechtel Jacobs 1998b
Lead	--	--	--	--	see Table L-10	--
Mercury	--	1.186	Fresh	Invertebrate infauna	Geometric mean	Bechtel Jacobs 1998b
Nickel	--	--	--	--	see Table L-10	--
Selenium	--	5.550	Marine	Molluscs	Average median	Thomann et al. 1995
Silver	--	0.180	Fresh	Oligochaete	Mean	Hirsch 1998
Zinc	--	--	--	--	see Table L-10	--

[1] Wet-weight (ww) BSAFs are converted to dry-weight (dw) using the following values:

Lipids (%):	1.48	bivalves	2.58	macroinvertebrates	USACOE 2010
TOC (%):	1.52	Mean measured (ECA Lagoon)			
Percent soilds:	0.21	USEPA 1993			

TABLE L-14
Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Fish
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Screening (Step 2)				
	BSAF (ww)	BAF (dw)[1]	Type	Basis	Reference
Metals					
Arsenic	--	0.126	Fresh	Mean	Pascoe et al. 1996
Cadmium	--	0.220	Marine	Median	PTI 1995
Chromium	--	0.038	Fresh	Mean	Krantzberg and Boyd 1992
Copper	--	0.100	Fresh	Mean	Krantzberg and Boyd 1992
Lead	--	0.130	Marine	Median	PTI 1995
Mercury	--	4.58	Fresh	Maximum	Cope et al. 1990
Nickel	--	1.00	--	Assumed	--
Selenium	--	1.00	--	Assumed	--
Silver	--	1.00	--	Assumed	--
Zinc	--	1.30	Marine	Median	PTI 1995

[1] Wet-weight (ww) BSAFs are converted to dry-weight (dw) using the following values:

Lipids (%):	6.00	USEPA 1997c; USACOE 2010
TOC (%):	1.52	Mean measured (ECA Lagoon)
Percent soilds:	0.25	USEPA 1993

TABLE L-14
Biota Sediment Accumulation Factors (Wet Weight) and Sediment Bioaccumulation Factors (Dry Weight) for Fish
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Baseline (Step 3A)				
	BSAF (ww)	BAF (dw)[1]	Type	Basis	Reference
Metals					
Arsenic	--	0.126	Fresh	Mean	Pascoe et al. 1996
Cadmium	--	0.220	Marine	Median	PTI 1995
Chromium	--	0.038	Fresh	Mean	Krantzberg and Boyd 1992
Copper	--	0.100	Fresh	Mean	Krantzberg and Boyd 1992
Lead	--	0.130	Marine	Median	PTI 1995
Mercury	--	3.25	Fresh	Mean	Cope et al. 1990
Nickel	--	1.00	--	Assumed	--
Selenium	--	1.00	--	Assumed	--
Silver	--	1.00	--	Assumed	--
Zinc	--	1.30	Marine	Median	PTI 1995

[1] Wet-weight (ww) BSAFs are converted to dry-weight (dw) using the following values:

Lipids (%):	6.00	USEPA 1997c; USACOE 2010
TOC (%):	1.52	Mean measured (ECA Lagoon)
Percent soilds:	0.25	USEPA 1993

TABLE L-15
Exposure Parameters for Upper Trophic Level Ecological Receptors - Screening
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Receptor	Body Weight (kg)		Water Ingestion Rate (L/day)		Food Ingestion Rate (kg/day - dry)	
	Value	Reference	Value	Reference	Value	Reference
Birds						
Cave swallow (terrestrial)	0.0144	Dunning 2008 (minimum for male/female - Puerto Rico)	0.0042	allometric equation (USEPA 1993)[1]	0.0044	allometric equation (Nagy 2001)[3]
Cave swallow (aquatic)	0.0144	Dunning 2008 (minimum for male/female - Puerto Rico)	0.0042	allometric equation (USEPA 1993)[1]	0.0044	allometric equation (Nagy 2001)[3]
Common ground dove	0.0224	Dunning 2008 (minimum - Puerto Rico [gender not reported])	0.0070	allometric equation (USEPA 1993)[1]	0.0081	allometric equation (Nagy 2001)[4]
Green heron	0.138	Dunning 2008 (minimum for male/female - Caibbean)	0.0214	allometric equation (USEPA 1993)[1]	0.0257	allometric equation (Nagy 2001)[4]
Pearly-eyed thrasher	0.080	Dunning 2008 (minimum for male/female - Puerto Rico)	0.0157	allometric equation (USEPA 1993)[1]	0.0174	allometric equation (Nagy 2001)[3]
Red-tailed hawk	0.957	USEPA 1993 (lowest of 6 adult values [3 male/3 female])	0.0680	allometric equation (USEPA 1993)[1]	0.0395	Sample and Suter 1994
Spotted sandpiper	0.029	Dunning 2008 (minimum - Pennsylvania [gender not reported])	0.0089	allometric equation (USEPA 1993)[1]	0.0105	allometric equation (Nagy 2001)[4]
White-cheeked pintail	0.402	Dunning 2008 (minimum for male/female - Suriname)	0.0434	allometric equation (USEPA 1993)[1]	0.0529	allometric equation (Nagy 2001)[4]
Mammals						
Fishing bat	0.0314	Silva and Downing 1995 (minimum for male/female - Trinidad/Tobago)	0.0103	allometric equation (USEPA 1993)[2]	0.0070	allometric equation (Nagy 2001)[7]
Fruit bat	0.0341	Silva and Downing 1995 (minimum for male/female - Virgin Islands)	0.0080	allometric equation (USEPA 1993)[2]	0.0058	allometric equation (Nagy 2001)[7]
Indian mongoose	0.312	Silva and Downing 1995 (minimum for male/female - Puerto Rico)	0.0933	allometric equation (USEPA 1993)[2]	0.0460	allometric equation (Nagy 2001)[6]
Norway rat	0.168	Silva and Downing 1995 (minimum for male/female - Arkansas)	0.0516	allometric equation (USEPA 1993)[2]	0.0398	allometric equation (Nagy 2001)[5]
Velvet free-tailed bat (terrestrial)	0.0080	Silva and Downing 1995 (minimum for male/female - Virgin Islands)	0.0018	allometric equation (USEPA 1993)[2]	0.0019	allometric equation (Nagy 2001)[7]
Velvet free-tailed bat (aquatic)	0.0080	Silva and Downing 1995 (minimum for male/female - Virgin Islands)	0.0018	allometric equation (USEPA 1993)[2]	0.0019	allometric equation (Nagy 2001)[7]

1 - All birds equation: 0.059 $(BW)^{0.67}$ (maximum body weight used: thrasher - 0.138 kg; heron - 0.220 kg; hawk - 1.235 kg; sandpiper - 0.0598 kg; dove - 0.0412 kg; swallow - 0.0195 kg; pintail - 0.633 kg)

2 - All mammals equation: 0.099 $(BW)^{0.90}$ (maximum body weight used: rat - 0.485 kg; mongoose - 0.936 kg; fruit bat - 0.0615 kg; free-tailed bat - 0.0117 kg; fishing bat - 0.0813 kg)

3 - Insectivorous birds equation: $(0.54*((BW*1000)^{0.705}))/1000$ (maximum body weight used: 0.138 kg)

4 - All birds equation: $(0.638*((BW*1000)^{0.685})/1000$ (maximum body weight used: heron - 0.220 kg; sandpiper - 0.0598 kg)

5 - Rodent equation used: $(0.332*((BW*1000)^{0.774}))/1000$ (maximum body weight used - 0.485 kg)

6 - Carnivore equation used: $(0.153*((BW*1000)^{0.834})/1000$ (maximum body weight used - 0.936 kg)

7 - Bat equation used: $(0.365*((BW*1000)^{0.671}))/1000$

TABLE L-15
Exposure Parameters for Upper Trophic Level Ecological Receptors - Screening
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Receptor	Dietary Composition (percent)							Soil/ Sediment Ingestion (percent)	
	Terrestrial Plants	Soil Invertebrates	Small Mammals	Fish	Aquatic Plants	Aquatic Invertebrates	Reference	Value	Reference
Birds									
Cave swallow (terrestrial)	0	100	0	0	0	0	Sample et al. 1997; Ehrlich et al. 1988	0	Sample et al. 1997
Cave swallow (aquatic)	0	0	0	0	0	100	Sample et al. 1997; Ehrlich et al. 1988	0	Sample et al. 1997
Common ground dove	95.0	0	0	0	0	0	Martin et al. 1951	5.0	Assumed based upon diet
Green heron	0	0	0	100	0	0	Exclusive diet	0	Sample et al. 1997
Pearly-eyed thrasher	0	95.4	0	0	0	0	Exclusive diet	4.6	Sample and Suter 1994 (value is for American robin)
Red-tailed hawk	0	0	100	0	0	0	USEPA 1993; Sample and Suter 1994	0	Sample and Suter 1994
Spotted sandpiper	0	0	0	0	0	82.0	USEPA 1993	18.0	Beyer et al. 1994
White-cheeked pintail	0	0	0	0	96.7	0	Exclusive diet	3.3	Beyer et al. 1994 (value is for mallard)
Mammals									
Fishing bat	0	0	0	100	0	0	Brooke 1994 (aquatic dietary component)	0	Assumed based upon diet
Fruit bat	100	0	0	0	0	0	Ortega and Castro-Arellano 2001	0	Assumed based upon diet
Indian Mongoose	0	97.2	0	0	0	0	Exclusive diet	2.8	Beyer et al. 1994 (value is for red fox)
Norway rat	98.0	0	0	0	0	0	Exclusive diet	2.0	Beyer et al. 1994 (value is for deer mouse)
Velvet free-tailed bat (terrestrial)	0	100	0	0	0	0	Reid 2009	0	Assumed based upon diet
Velvet free-tailed bat (aquatic)	0	0	0	0	0	100	Reid 2009	0	Assumed based upon diet

TABLE L-16
Exposure Parameters for Upper Trophic Level Ecological Receptors - Baseline
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Receptor	Body Weight (kg)		Water Ingestion Rate (L/day)		Food Ingestion Rate (kg/day - dry)		Home Range (ha)	
	Value	Reference	Value	Reference	Value	Reference	Value	Reference
Birds								
Cave swallow (terrestrial)	0.0158	Dunning 2008 (mean for male/female - Puerto Rico)	0.0037	allometric equation (USEPA 1993)[1]	0.0038	allometric equation (Nagy 2001)[5]	No data	--
Cave swallow (aquatic)	0.0158	Dunning 2008 (mean for male/female - Puerto Rico)	0.0037	allometric equation (USEPA 1993)[1]	0.0038	allometric equation (Nagy 2001)[5]	No data	--
Common ground dove	0.0320	Dunning 2008 (mean - Puerto Rico [gender not reported])	0.0059	allometric equation (USEPA 1993)[1]	0.0069	allometric equation (Nagy 2001)[4]	No data	--
Green heron	0.187	Dunning 2008 (mean for male/female - Caibbean)	0.0192	allometric equation (USEPA 1993)[1]	0.0230	allometric equation (Nagy 2001)[4]	No data	--
Pearly-eyed thrasher	0.104	Dunning 2008 (mean for male/female - Puerto Rico)	0.0129	allometric equation (USEPA 1993)[1]	0.0123	allometric equation (Nagy 2001)[3]	No data	--
Red-tailed hawk	1.134	USEPA 1993 (mean of 6 adult values [3 male/3 female])	0.0642	allometric equation (USEPA 1993)[1]	0.0363	Sample and Suter 1994	859	USEPA 1993 (mean for male/female adults)
Spotted sandpiper	0.0404	Dunning 2008 (mean - Pennsylvania [gender not reported])	0.0069	allometric equation (USEPA 1993)[1]	0.0080	allometric equation (Nagy 2001)[4]	0.25	USEPA 1993 (approximate)
White-cheeked pintail	0.519	Dunning 2008 (mean for male/female - Suriname)	0.0380	allometric equation (USEPA 1993)[1]	0.0462	allometric equation (Nagy 2001)[4]	No data	--
Mammals								
Fishing bat	0.0544	Silva and Downing 1995 (midpoint for male/female - Trinidad/Tobago)	0.0072	allometric equation (USEPA 1993)[2]	0.0053	allometric equation (Nagy 2001)[8]	No data	--
Fruit bat	0.0408	Silva and Downing 1995 (mean for male/female - Virgin Islands)	0.0056	allometric equation (USEPA 1993)[2]	0.0044	allometric equation (Nagy 2001)[8]	0.6 to 8 km radius	Ortega and Castro-Arellano 2001
Indian mongoose	0.528	Silva and Downing 1995 (mean for male/female - Puerto Rico)	0.0557	allometric equation (USEPA 1993)[2]	0.0285	allometric equation (Nagy 2001)[7]	3.20	Nellis 1989
Norway rat	0.209	Silva and Downing 1995 (mean for male/female - Arkansas)	0.0242	allometric equation (USEPA 1993)[2]	0.0207	allometric equation (Nagy 2001)[6]	0.24	Stroud 1982
Velvet free-tailed bat (terrestrial)	0.0101	Silva and Downing 1995 (mean for male/female - Virgin Islands)	0.0016	allometric equation (USEPA 1993)[2]	0.0017	allometric equation (Nagy 2001)[8]	No data	--
Velvet free-tailed bat (aquatic)	0.0101	Silva and Downing 1995 (mean for male/female - Virgin Islands)	0.0016	allometric equation (USEPA 1993)[2]	0.0017	allometric equation (Nagy 2001)[8]	No data	--

1 - All birds equation: $0.059\ (BW)^{0.67}$
2 - All mammals equation: $0.099\ (BW)^{0.90}$
3 - Omnivorous birds equation: $(0.67*((BW*1000)^{0.627}))/1000$
4 - All birds equation: $(0.638*((BW*1000)^{0.685}))/1000$
5 - Insectivorous birds equation: $(0.54*((BW*1000)^{0.705}))/1000$
6 - Rodent equation used: $(0.332*((BW*1000)^{0.774}))/1000$
7 - Carnivore equation used: $(0.153*((BW*1000)^{0.834}))/1000$
8 - Bat equation used: (0.365*((BW*1000)0.671))/1000
Note: an area use factor of 1 was assumed for the baseline risk assessment

TABLE L-16
Exposure Parameters for Upper Trophic Level Ecological Receptors - Baseline
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Receptor	Dietary Composition (percent)							Soil/ Sediment Ingestion (percent)	
	Terrestrial Plants	Soil Invertebrates	Small Mammals	Fish	Aquatic Plants	Aquatic Invertebrates	Reference	Value	Reference
Birds									
Cave swallow (terrestrial)	0	100	0	0	0	0	Sample et al. 1997; Ehrlich et al. 1988	0	Sample et al. 1997
Cave swallow (aquatic)	0	0	0	0	0	100	Sample et al. 1997; Ehrlich et al. 1988	0	Sample et al. 1997
Common ground dove	95.0	0	0	0	0	0	Martin et al. 1951	5.0	Assumed based upon diet
Green heron	0	0	0	71.0	0	29.0	Sample et al. 1997	0	Sample et al. 1997
Pearly-eyed thrasher	20.0	75.4	0	0	0	0	Oberle 2000 (estimated based on description of diet)	4.6	Sample and Suter 1994 (value is for American robin)
Red-tailed hawk	0	0	100	0	0	0	USEPA 1993; Sample and Suter 1994	0	Sample and Suter 1994
Spotted sandpiper	0	0	0	0	0	82.0	USEPA 1993	18.0	Beyer et al. 1994
White-cheeked pintail	0	0	0	0	90.3	6.4	Martin et al. 1951 (average for winter, fall, summer)	3.3	Beyer et al. 1994 (value is for mallard)
Mammals									
Fishing bat	0	0	0	100	0	0	Brooke 1994 (aquatic dietary component)	0	Assumed based upon diet
Fruit bat	100	0	0	0	0	0	Ortega and Castro-Arellano 2001	0	Assumed based upon diet
Indian mongoose	11.1	56.4	29.7	0	0	0	Nellis 1989	2.8	Beyer et al. 1994 (value is for red fox)
Norway rat	49.0	49.0	0	0	0	0	Linzey 1998 (estimated based on description of diet)	2.0	Beyer et al. 1994 (value is for deer mouse)
Velvet free-tailed bat (terrestrial)	0	100	0	0	0	0	Reid 2009	0	Assumed based upon diet
Velvet free-tailed bat (aquatic)	0	0	0	0	0	100	Reid 2009	0	Assumed based upon diet

TABLE L-17
Soil Ecological Screening Values (ESVs) for Plants and Soil Invertebrates
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	ESV	Units	Type/Receptor	Reference	Comments
Inorganics					
Aluminum	pH < 5.5	--	Eco-SSL	USEPA 2003a	
Antimony	78.0	mg/kg	Eco-SSL - Invertebrate	USEPA 2005a	
Arsenic	18.0	mg/kg	Eco-SSL - Plant	USEPA 2005b	
Barium	330	mg/kg	Eco-SSL - Invertebrate	USEPA 2005c	
Beryllium	40.0	mg/kg	Eco-SSL - Invertebrate	USEPA 2005d	
Cadmium	32.0	mg/kg	Eco-SSL - Plant	USEPA 2005e	
Chromium (total)	64.0	mg/kg	Soil Quality Guideline	CCME 2007	
Chromium (hexavalent)	0.40	mg/kg	Soil Quality Guideline	CCME 2007	
Cobalt	13.0	mg/kg	Eco-SSL - Plant	USEPA 2005f	
Copper	70.0	mg/kg	Eco-SSL - Plant	USEPA 2007a	
Iron	5 < pH > 8	--	Eco-SSL	USEPA 2003b	
Lead	120	mg/kg	Eco-SSL - Plant	USEPA 2005g	
Manganese	220	mg/kg	Eco-SSL - Plant	USEPA 2007b	
Mercury	0.10	mg/kg	Invertebrate	Efroymson et al. 1997b	
Nickel	38.0	mg/kg	Eco-SSL - Plant	USEPA 2007c	
Selenium	0.52	mg/kg	Eco-SSL - Plant	USEPA 2007d	
Silver	560	mg/kg	Eco-SSL - Plant	USEPA 2006a	
Thallium	1.00	mg/kg	Plant	Efroymson et al. 1997a	
Vanadium	130	mg/kg	Soil Quality Guideline	CCME 2007	
Zinc	120	mg/kg	Eco-SSL - Invertebrate	USEPA 2007e	
Explosives					
1,3,5-Trinitrobenzene	--	--	--	--	
1,3-Dinitrobenzene	--	--	--	--	
2,4,6-Trinitrotoluene	10,000	ug/kg	Plant	Talmage et al. 1999	
2,4-Dinitrotoluene	11,000	ug/kg	Plant/Invertebrate	NRCC 2006	
2,6-Dinitrotoluene	8,500	ug/kg	Plant/Invertebrate	NRCC 2006	
2-Amino-4,6-dinitrotoluene	80,000	ug/kg	Plant	Talmage et al. 1999	
2-Nitrotoluene	--	--	--	--	
3,5-Dinitroaniline	--	--	--	--	
3-Nitrotoluene	--	--	--	--	
4-Amino-2,6-dinitrotoluene	--	--	--	--	
4-Nitrotoluene	--	--	--	--	
HMX	10,000	ug/kg	Invertebrate	Talmage et al. 1999	
Nitrobenzene	2,260	ug/kg	Invertebrate	Efroymson et al. 1997b	LC50 of 226,000; UF of 100
Nitroglycerine	--	--	--	--	
Nitroguanidine	--	--	--	--	
Perchlorate	1,000	ug/kg	Invertebrate	USEPA 2002	
PETN	--	--	--	--	
RDX	10,000	ug/kg	Invertebrate	Talmage et al. 1999	
Tetryl	10,000	ug/kg	Plant	Talmage et al. 1999	

TABLE L-18
Marine Surface Water Ecological Screening Values (ESVs)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	ESV	Units	Type	Reference	Comments
Inorganics					
Aluminum	87.0	ug/L	Freshwater	USEPA 2009	AWQC
Antimony	500	ug/L		Buchman 2008	Proposed AWQC
Arsenic	36.0	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Arsenic	36.0	ug/L	Dissolved	USEPA 2009	AWQC
Barium	200	ug/L		Buchman 2008	British Columbia value
Beryllium	100	ug/L		Buchman 2008	British Columbia value
Cadmium	8.85	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Cadmium	8.80	ug/L	Dissolved	USEPA 2009	AWQC
Chromium	50.4	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Chromium	50.0	ug/L	Dissolved	USEPA 2009	AWQC
Cobalt	23.0	ug/L	Freshwater	Suter and Tsao 1996	Secondary Chronic Value
Copper	3.73	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Copper	3.10	ug/L	Dissolved	USEPA 2009	AWQC
Iron	50.0	ug/L		Buchman 2008	British Columbia value
Lead	8.52	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Lead	8.10	ug/L	Dissolved	USEPA 2009	AWQC
Manganese	100	ug/L		Buchman 2008	British Columbia value
Mercury	1.11	ug/L	Total	USEPA 2009	AWQC
Mercury	0.94	ug/L	Dissolved	USEPA 2009	AWQC
Nickel	8.28	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Nickel	8.20	ug/L	Dissolved	USEPA 2009	AWQC
Selenium	71.1	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Selenium	71.0	ug/L	Dissolved	USEPA 2009	AWQC
Silver	2.24	ug/L		PREQB 2010	Water Quality Standards (Aquatic Life)
Thallium	21.3	ug/L		USEPA 2001	USEPA Region 4 value
Vanadium	50.0	ug/L		Buchman 2008	British Columbia value
Zinc	85.6	ug/L	Total	PREQB 2010; USEPA 2009	Water Quality Standards (Aquatic Life); AWQC
Zinc	81.0	ug/L	Dissolved	USEPA 2009	AWQC
Explosives					
1,3,5-Trinitrobenzene	15.0	ug/L	NOEC	Nipper et al. 2001	
1,3-Dinitrobenzene	180	ug/L	NOEC	Nipper et al. 2001	
2,4,6-Trinitrotoluene	100	ug/L		USEPA 2006b	TRNCC (2001) value

TABLE L-18
Marine Surface Water Ecological Screening Values (ESVs)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	ESV	Units	Type	Reference	Comments
2,4-Dinitrotoluene	480	ug/L	NOEC	Nipper et al. 2001	
2,6-Dinitrotoluene	1,000	ug/L	NOEC	Nipper et al. 2001	
2-Amino-4,6-dinitrotoluene	--	--	--	--	
2-Nitrotoluene	--	--	--	--	
3,5-Dinitroaniline	--	--	--	--	
3-Nitrotoluene	--	--	--	--	
4-Amino-2,6-dinitrotoluene	--	--	--	--	
4-Nitrotoluene	1,900	ug/L	Freshwater	USEPA 2006b	TRNCC (2000; 2001) value
HMX	--	--	--	--	
Nitrobenzene	66.8	ug/L		USEPA 2001	USEPA Region 4 value
Nitroglycerine	--	--	--	--	
Nitroguanidine	--	--	--	--	
Perchlorate	--	--	--	--	
PETN	--	--	--	--	
RDX	5,000	ug/L	NOEC	Nipper et al. 2001	
Tetryl	8.00	ug/L	NOEC	Nipper et al. 2001	

Yellow shaded cells in the screening value column indicate freshwater screening values (from the final ERA Protocol) extrapolated to this marine site due to the lack of available marine values

1 - AWQC: Ambient Water Quality Criterion; FCV: Final Chronic Value; FRV: Final Residue Value; NOEC: No Observed Effect Concentration

TABLE L-19
Marine Sediment Ecological Screening Values (ESVs)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	ESV	Units	Type[1]	Reference	Comments
Inorganics					
Aluminum	18,000	mg/kg	AET	Buchman 2008	Neanthes
Antimony	2.00	mg/kg	ER-L	Long and Morgan 1990	
Arsenic	8.20	mg/kg	ER-L	Long et al. 1995	
Barium	48.0	mg/kg	AET	Buchman 2008	Amphipod
Beryllium	--	--	--	--	
Cadmium	1.20	mg/kg	ER-L	Long et al. 1995	
Chromium	81.0	mg/kg	ER-L	Long et al. 1995	
Cobalt	10.0	mg/kg	AET	Buchman 2008	Neanthes
Copper	34.0	mg/kg	ER-L	Long et al. 1995	
Iron	220,000	mg/kg	AET	Buchman 2008	Neanthes
Lead	46.7	mg/kg	ER-L	Long et al. 1995	
Manganese	260	mg/kg	AET	Buchman 2008	Neanthes
Mercury	0.15	mg/kg	ER-L	Long et al. 1995	
Nickel	20.9	mg/kg	ER-L	Long et al. 1995	
Selenium	1.00	mg/kg	AET	Buchman 2008	Amphipod
Silver	1.00	mg/kg	ER-L	Long et al. 1995	
Thallium	--	--	--	--	
Vanadium	57.0	mg/kg	AET	Buchman 2008	Neanthes
Zinc	150	mg/kg	ER-L	Long et al. 1995	
Explosives					
1,3,5-Trinitrobenzene	7,000	ug/kg	NOEC	NAVFAC 2007	Amphipod
1,3-Dinitrobenzene	--	--	--	--	
2,4,6-Trinitrotoluene	20,000	ug/kg	NOEC	NAVFAC 2007	Amphipod
2,4-Dinitrotoluene	--	--	--	--	
2,6-Dinitrotoluene	549	ug/kg	NOEC	Nipper et al. 2002	Fine-grained sediment
2-Amino-4,6-dinitrotoluene	--	--	--	--	
2-Nitrotoluene	--	--	--	--	
3,5-Dinitroaniline	--	--	--	--	
3-Nitrotoluene	--	--	--	--	
4-Amino-2,6-dinitrotoluene	--	--	--	--	
4-Nitrotoluene	--	--	--	--	
HMX	115,000	ug/kg	NOEC	NAVFAC 2007	Estuarine amphipod

TABLE L-19
Marine Sediment Ecological Screening Values (ESVs)
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	ESV	Units	Type[1]	Reference	Comments
Nitrobenzene	21.0	ug/kg	AET	Buchman 2008	Neanthes
Nitroglycerine	--	--	--	--	
Nitroguanidine	--	--	--	--	
Perchlorate	--	--	--	--	
PETN	--	--	--	--	
RDX	891,000	ug/kg	NOEC	NAVFAC 2007	Polychaete
Tetryl	72.0	ug/kg	NOEC	Nipper et al. 2002	Fine-grained sediment

1 - AET: Apparent Effect Threshold; ER-L: Effects Range-Low; ISQG: Interim Sediment Quality Guideline; NOEC: No Observed Effect Concenttration; T20: Toxicity (20%); TEC: Threshold Effect Concentration; TEL: Threshold Effect Level

TABLE L-20
Uncertainty Factors
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Convert From	Convert To	Uncertainty Factor
Chronic NOAEL or NOEC	Chronic NOAEL or NOEC	1
Chronic LOAEL or LOEC	Chronic NOAEL or NOEC	5
Chronic NOAEL or NOEC	Chronic LOAEL or LOEC	5
Subchronic NOAEL or NOEC	Chronic NOAEL or NOEC	10
Subchronic LOAEL or LOEC	Chronic NOAEL or NOEC	20
Acute NOAEL or NOEC	Chronic NOAEL or NOEC	30
Acute LOAEL or LOEC	Chronic NOAEL or NOEC	50
LD50 or LC50	Chronic NOAEL or NOEC	100

Uncertainty factors from Wentsel et al. (1996)
Durations are defined as follows (USEPA 1999; Sample et al. 1996):
- Acute: <3 days (plants, invertebrates) and <14 days (fish, birds, mammals)
- Subchronic: 3 - 6 days (plants, invertebrates) and 14 - 90 days (fish, birds, mammals)
- Chronic: >7 days (plants, invertebrates) and >90 days or during critical life stage (fish, birds, mammals)

TABLE L-21
Eco-SSL Values for Birds and Mammals
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Bird	Mammal	Units	Reference
Metals				
Antimony	--	0.27	mg/kg	USEPA 2005a
Arsenic	43.0	46.0	mg/kg	USEPA 2005b
Barium	--	2,000	mg/kg	USEPA 2005c
Beryllium	--	21.0	mg/kg	USEPA 2005d
Cadmium	0.77	0.36	mg/kg	USEPA 2005e
Chromium	26.0	34.0	mg/kg	USEPA 2008
Cobalt	120	230	mg/kg	USEPA 2005f
Copper	28.0	49.0	mg/kg	USEPA 2007a
Lead	11.0	56.0	mg/kg	USEPA 2005g
Manganese	4,300	4,000	mg/kg	USEPA 2007b
Nickel	210	130	mg/kg	USEPA 2007c
Selenium	1.20	0.63	mg/kg	USEPA 2007d
Silver	4.20	14.0	mg/kg	USEPA 2006a
Vanadium	7.80	280	mg/kg	USEPA 2005h
Zinc	46.0	79.0	mg/kg	USEPA 2007e

TABLE L-22
Ingestion-Based Toxicity Reference Values (TRVs) for Mammals
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Chemical Form	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	Reference	NOAEL (mg/kg/d)	Reference	MATC (mg/kg/d)
Metals											
Antimony	--	rat	--	31 days	oral in water	survival, growth, reproduction	0.590	USEPA 2005a	0.059	USEPA 2005a	0.187
Arsenic	Arsenite (As+3)	mouse	0.03	3 generations	oral in water/food	reproduction	1.26	Sample et al. 1996	0.25 a	--	0.56
Arsenic	--	dog	--	8 weeks	oral in diet	survival, growth, reproduction	1.66	USEPA 2005b	1.04	USEPA 2005b	1.31
Barium	--	multiple	--	--	oral	survival, growth, reproduction	259 b	--	51.8	USEPA 2005c	116
Beryllium	--	rat	--	4 years	oral in water	survival, growth, reproduction	2.66 b	--	0.53	USEPA 2005d	1.19
Cadmium	--	rat	--	2 weeks	oral in water	survival, growth, reproduction	7.70	USEPA 2005e	0.77	USEPA 2005e	2.43
Chromium	Cr+3	multiple	--	--	oral	survival, growth, reproduction	12.0 b	--	2.40	USEPA 2008	5.37
Chromium	Cr+6	multiple	--	--	oral	survival, growth, reproduction	46.2 b	--	9.24	USEPA 2008	20.7
Cobalt	--	multiple	--	--	oral	survival, growth, reproduction	36.7 b	--	7.33	USEPA 2005f	16.4
Copper	--	pig	--	4 weeks	oral in diet	survival, growth, reproduction	9.34	USEPA 2007a	5.60	USEPA 2007a	7.23
Copper	Copper sulfate	mink	1.00	357 days	oral in diet	reproduction	15.1	Sample et al. 1996	11.7	Sample et al. 1996	13.3
Lead	--	rat	--	7 weeks	oral in water	survival, growth, reproduction	8.90	USEPA 2005g	4.70	USEPA 2005g	6.47
Manganese	--	multiple	--	--	oral	survival, growth, reproduction	258 b	--	51.5	USEPA 2007b	115
Mercury	Methyl mercury chloride	rat	0.35	3 generations	oral in diet	reproduction	0.160	Sample et al. 1996	0.032	Sample et al. 1996	0.072
Mercury	Methyl mercury chloride	mink	1.00	93 days	oral in diet	survival/weight loss	0.25 c	Sample et al. 1996	0.15 c	Sample et al. 1996	0.19
Nickel	--	mouse	--	35 days	oral	survival, growth, reproduction	3.40	USEPA 2007c	1.70	USEPA 2007c	2.40
Selenium	Potassium selenate	rat	0.35	1 year	oral in water	reproduction	0.33	Sample et al. 1996	0.20	Sample et al. 1996	0.26
Silver	--	pig	--	40 days	oral in diet	survival, growth, reproduction	60.2	USEPA 2006a	12.0 a	--	26.9
Vanadium	--	mouse	--	12 days	oral (gavage)	survival, growth, reproduction	8.31	USEPA 2005h	4.16	USEPA 2005h	5.88
Zinc	--	multiple	--	--	oral	survival, growth, reproduction	377 b	--	75.4	USEPA 2007e	169
Explosives											
1,3,5-Trinitrobenzene	--	rat	0.35	2 years	oral in diet	reproduction	13.4	Talmage et al. 1999	2.64	Talmage et al. 1999	5.96
2,4,6-Trinitrotoluene	--	rat	0.289	13 weeks	oral in diet	reproduction	160	Talmage et al. 1999	34.7	Talmage et al. 1999	74.5
HMX	--	mouse	0.024	13 weeks	oral in diet	survival	75.0	Talmage et al. 1999	30.0	Talmage et al. 1999	47.4
Nitrobenzene	--	--	--	--	--	--	NA	--	NA	--	NA
Perchlorate	--	multiple	--	chronic	oral	multiple	32.0	USACHPPM 2007	6.40	USACHPPM 2007	14.3

NA - Not Available
[a] Uncertainty factor of 5 applied to LOAEL
[b] Uncertainty factor of 5 applied to NOAEL
[c] Does not include subchronic uncertainty factor of 10 applied by Sample et al (1996) since the study duration meets the criteria for a chronic study in Table L-20

TABLE L-23
Ingestion-Based Toxicity Reference Values (TRVs) for Birds
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Chemical Form	Test Organism	Body Weight (kg)	Duration	Exposure Route	Effect/Endpoint	LOAEL (mg/kg/d)	Reference	NOAEL (mg/kg/d)	Reference	MATC (mg/kg/d)
Metals											
Antimony	--	--	--	--	--	--	NA	--	NA	--	NA
Arsenic	--	chicken	--	19 days	oral in diet	survival, growth,reproduction	11.2 b	--	2.24	USEPA 2005b	5.01
Arsenic	Sodium arsenite	mallard	1.00	128 days	oral in diet	survival	12.8	Sample et al. 1996	5.14	Sample et al. 1996	8.12
Barium	Barium hydroxide	chicken (chicks)	0.121	4 weeks	oral in diet	survival	41.7 c	Sample et al. 1996	20.8 c	Sample et al. 1996	29.5
Beryllium	--	--	--	--	--	--	NA	--	NA	--	NA
Cadmium	--	multiple	--	--	oral in diet	survival, growth,reproduction	7.35 b	--	1.47	USEPA 2005e	3.29
Chromium	Cr+3	multiple	--	--	oral in diet	survival, growth,reproduction	13.3 b	--	2.66	USEPA 2008	5.95
Cobalt	--	multiple	--	--	oral in diet	survival, growth,reproduction	38.1 b	--	7.61	USEPA 2005f	17.0
Copper	--	chicken	--	84 days	oral in diet	survival, growth,reproduction	12.1	USEPA 2007a	4.05	USEPA 2007a	7.00
Lead	--	chicken	--	4 weeks	oral in diet	survival, growth,reproduction	3.26	USEPA 2005g	1.63	USEPA 2005g	2.31
Lead	Metallic	American kestrel	0.13	7 months	oral in diet	reproduction	19.3 b	--	3.85	Sample et al. 1996	8.61
Manganese	--	multiple	--	--	oral	survival, growth,reproduction	895 b	--	179	USEPA 2007b	400
Mercury	Mercury chloride	Japanese quail	0.15	1 year	oral in diet	reproduction	0.90	Sample et al. 1996	0.45	Sample et al. 1996	0.64
Mercury	--	red-tailed hawk	1.10	12 weeks	oral in diet	survival/neurological	1.20	USEPA 1995b	0.49	USEPA 1995b	0.77
Mercury	Methyl mercury	mallard	1.00	3 generations	oral in diet	reproduction	0.078	USEPA 1997b	0.026	USEPA 1997b	0.045
Nickel	--	multiple	--	--	oral in diet	survival, growth,reproduction	33.6 b	--	6.71	USEPA 2007c	15.0
Selenium	Selanomethionine	mallard	1.00	100 days	oral in diet	reproduction	0.80	Sample et al. 1996	0.40	Sample et al. 1996	0.57
Selenium	Selanomethionine	black-crowned night-heron	0.88	94 days	oral in diet	reproduction	9.00 b	--	1.80	Sample et al. 1996	4.02
Selenium	Selanomethionine	screech owl	0.20	13.7 weeks	oral in diet	reproduction	1.50	Sample et al. 1996	0.44	Sample et al. 1996	0.81
Selenium	--	chicken	--	2 weeks	oral in diet	survival, growth,reproduction	0.58	USEPA 2007d	0.29	USEPA 2007d	0.41
Silver	--	turkey	--	5 weeks	oral in diet	survival, growth	20.2	USEPA 2006a	4.04 a	--	9.03
Vanadium	Vanadyl sulfate	mallard	1.17	12 weeks	oral in diet	growth/survival	57.0 b	--	11.4	Sample et al. 1996	25.5
Vanadium	--	chicken	--	5 weeks	oral in diet	survival, growth,reproduction	0.688	USEPA 2005h	0.344	USEPA 2005h	0.486
Zinc	--	multiple	--	--	oral in diet	survival, growth,reproduction	331 b	--	66.1	USEPA 2007e	148
Explosives											
1,3,5-Trinitrobenzene	--	--	--	--	--	--	NA	--	NA	--	NA
2,4,6-Trinitrotoluene	--	rock dove	--	60 days	oral (gavage)	systemic	7.00 c	Johnson and Salice 2009	2.00 c	Johnson and Salice 2009	3.74
HMX	--	northern bobwhite	0.19	28 days	oral in diet	reproduction	79.0	Johnson and Salice 2009	7.90	Johnson and Salice 2009	25.0
Nitrobenzene	--	--	--	--	--	--	NA	--	NA	--	NA
Perchlorate	--	multiple	--	chronic	oral	multiple	26.0	USACHPPM 2007	13.0	USACHPPM 2007	18.4

NA - Not Available
[a] Uncertainty factor of 5 applied to LOAEL
[b] Uncertainty factor of 5 applied to NOAEL
[c] Subchronic to chronic uncertainty factor of 10 applied

TABLE L-24
Background Data and Upper Tolerance Limits (UTLs) - Surface Soi
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Ric

Chemical	TI			Combined Set			ECA Incremental
	Maximum	Mean	UTL	Maximum	Mean	UTL	UTLs
Inorganics (mg/kg)							
Aluminum	NR	NR	35,000	41,500	13,100	35,000	58,200
Antimony[1]	5.80	--	5.80	5.80	--	5.80	--
Arsenic	9.60	4.10	9.20	9.60	1.54	9.20	8.47
Barium	NR	NR	212	344	76.6	212	120
Beryllium	0.95	0.45	0.95	0.95	0.31	0.95	1.16
Cadmium	2.10	1.40	2.40	3.10	0.92	2.40	0.299
Calcium	362,000	162,000	417,000	362,000	46,143	417,000	59,500
Chromium	58.8	27.3	70.0	72.0	16.7	72.0	79.4
Cobalt	NR	NR	16.0	24.0	8.05	26.0	11.2
Copper	NR	NR	94.0	102	28.1	94.0	24.6
Iron	NR	NR	38,100	39,500	17,122	43,200	48,900
Lead	10.6	6.18	16.0	10.6	3.26	16.0	17.2
Magnesium	NR	NR	22,200	32,300	5,895	22,200	6,540
Manganese	NR	NR	1,630	1,630	533	1,630	1,040
Mercury	0.31	0.133	0.31	0.31	0.073	0.31	--
Nickel	NR	NR	41.0	40.0	7.06	41.0	23.0
Potassium	9,050	4,000	10,800	9,050	2,561	10,800	7,900
Selenium	1.30	1.51	1.30	1.30	1.79	1.30	1.31
Silver	NR	NR	0.22	0.22	0.51	0.22	--
Sodium	NR	NR	1,590	1,590	363	1,590	338
Thallium	NR	NR	0.13	0.13	0.12	0.13	--
Vanadium	50.3	24.8	56.0	142	49.8	144	71.7
Zinc	NR	NR	32.0	35.0	17.9	32.0	34.2

NR - Not Reported
1 - Maximum value from USEPA split samples

TABLE L-25
Screening Statistics for Plants and Soil Invertebrates - ECA Surface Soil (SMI, 0 - 2 inches) - Decision Units 1-4
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	Background UTL	Frequency of UTL Exceedance	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient	COPC for Risk Evaluation?
Explosives (UG/KG)																			
1,3,5-Trinitrobenzene	28.0 - 31.0	1 / 25	12.0	12.0	VEECA-4SMI05-0211	14.6	0.74	14.9	14.6	NSV	-- / --	NSV	YES	--	-- / --	--	NSV	NSV	YES
1,3-Dinitrobenzene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
2,4,6-Trinitrotoluene	28.0 - 31.0	1 / 27	26.0	26.0	VEECA-4SMI07-0211	15.1	2.22	15.9	15.0	10,000	0 / 27	0.003	NO	--	-- / --	--	--	--	NO
2,4-Dinitrotoluene	28.0 - 31.0	0 / 26	--	--	--	14.8	0.49	14.9	14.7	11,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
2,6-Dinitrotoluene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	8,500	-- / --	0.004	NO	--	-- / --	--	--	--	NO
2-Amino-4,6-dinitrotoluene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	80,000	-- / --	0.0004	NO	--	-- / --	--	--	--	NO
2-Nitrotoluene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3,5-Dinitroaniline	28.0 - 31.0	1 / 27	13.0	13.0	VEECA-4SMI15-0211	14.7	0.59	14.9	14.7	NSV	-- / --	NSV	YES	--	-- / --	--	NSV	NSV	YES
3-Nitrotoluene	30.0 - 31.0	0 / 5	--	--	--	15.2	0.27	15.5	15.2	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Amino-2,6-dinitrotoluene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Nitrotoluene	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
HMX	28.0 - 31.0	1 / 27	27.0	27.0	VEECA-4SMI05-0211	15.2	2.40	16.0	15.1	10,000	0 / 27	0.003	NO	--	-- / --	--	--	--	NO
Nitrobenzene	30.0 - 31.0	1 / 6	98.0	98.0	VEECA-4SMI03-0211	29.0	33.8	56.8	20.7	2,260	0 / 6	0.04	NO	--	-- / --	--	--	--	NO
Nitroglycerin	55.0 - 62.0	0 / 27	--	--	--	29.5	0.91	29.8	29.5	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Perchlorate	0.38 - 1.70	8 / 27	0.27	1.60	VEECA-4SMI04-0211	0.51	0.44	0.66	0.38	1,000	0 / 27	0.002	NO	--	-- / --	--	--	--	NO
PETN	55.0 - 62.0	0 / 27	--	--	--	29.5	0.91	29.8	29.5	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
RDX	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Tetryl	28.0 - 31.0	0 / 27	--	--	--	14.8	0.49	14.9	14.8	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	27 / 27	535	33,900	VEECA-4SMI15-0211	15,368	8,672	18,214	10,641	pH <5.5	0 / 27	--	NO	--	-- / --	--	--	--	NO
Antimony	10.0 - 10.0	0 / 27	--	--	--	5.00	0.0	5.00	5.00	78.0	-- / --	0.13	NO	--	-- / --	--	--	--	NO
Arsenic	3.00 - 3.00	23 / 27	1.70	36.1	VEECA-4SMI02-0211	9.44	7.99	12.1	6.64	18.0	2 / 27	2.01	YES	8.47	12 / 27	4.26	0.67	0.52	NO
Barium	-- - --	27 / 27	7.00	73.2	VEECA-3SMI01-0211	26.8	15.1	31.7	22.7	330	0 / 27	0.22	NO	--	-- / --	--	--	--	NO
Beryllium	0.50 - 0.50	17 / 27	0.16	0.97	VEECA-4SMI15-0211	0.29	0.16	0.35	0.27	40.0	0 / 27	0.02	NO	--	-- / --	--	--	--	NO
Cadmium	0.50 - 0.50	14 / 27	0.15	0.46	VEECA-4SMI09-0211	0.24	0.061	0.26	0.23	32.0	0 / 27	0.01	NO	--	-- / --	--	--	--	NO
Calcium [3]	-- - --	27 / 27	26,300	324,000	VEECA-1SMI02-0211	148,889	83,189	176,196	127,784	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Chromium	-- - --	27 / 27	6.20	59.4	VEECA-4SMI15-0211	30.4	14.5	35.2	25.6	64.0	0 / 27	0.93	NO	--	-- / --	--	--	--	NO
Cobalt	2.50 - 2.50	23 / 27	1.50	12.5	VEECA-4SMI05-0211	5.81	3.31	6.90	4.69	13.0	0 / 27	0.96	NO	--	-- / --	--	--	--	NO
Copper	2.50 - 2.50	25 / 27	1.10	24.8	VEECA-4SMI05-0211	16.0	7.69	18.5	12.2	70.0	0 / 27	0.35	NO	--	-- / --	--	--	--	NO
Iron	-- - --	27 / 27	758	38,000	VEECA-4SMI15-0211	17,689	9,674	20,865	12,411	5 < pH > 8	5 / 27	--	YES	48,900	0 / 27	0.78	--	--	NO
Lead	2.50 - 5.00	13 / 27	1.30	15.0	VEECA-4SMI15-0211	2.99	3.20	4.04	2.17	120	0 / 27	0.13	NO	--	-- / --	--	--	--	NO
Magnesium [3]	-- - --	27 / 27	5,800	16,500	VEECA-4SMI02-0211	8,815	3,012	9,804	8,413	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Manganese	-- - --	27 / 27	28.5	838	VEECA-4SMI15-0211	428	248	509	307	220	19 / 27	3.81	YES	1,040	0 / 27	0.81	--	--	NO
Nickel	2.50 - 2.50	23 / 27	2.60	17.1	VEECA-4SMI15-0211	9.11	4.63	10.6	7.15	38.0	0 / 27	0.45	NO	--	-- / --	--	--	--	NO
Potassium [3]	-- - --	27 / 27	169	7,170	VEECA-4SMI15-0211	3,032	1,691	3,587	2,262	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Selenium	2.00 - 2.00	19 / 27	0.50	2.20	VEECA-1SMI01-0211	1.11	0.43	1.25	1.04	0.52	18 / 27	4.23	YES	1.31	6 / 27	1.68	2.41	2.14	YES
Silver	1.00 - 1.00	0 / 27	--	--	--	0.50	0.0	0.50	0.50	560	-- / --	0.002	NO	--	-- / --	--	--	--	NO
Sodium [3]	-- - --	27 / 27	225	8,570	VEECA-3SMI02-0211	2,162	2,807	3,084	996	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Thallium	0.50 - 1.00	0 / 27	--	--	--	0.38	0.13	0.42	0.36	1.00	-- / --	1.00	YES	--	-- / --	--	0.42	0.38	NO
Vanadium	-- - --	27 / 27	3.90	71.4	VEECA-4SMI05-0211	41.1	21.5	48.1	31.3	130	0 / 27	0.55	NO	--	-- / --	--	--	--	NO
Zinc	5.00 - 5.00	25 / 27	2.50	63.8	VEECA-2SMI04-0211	27.2	14.9	32.1	20.4	120	0 / 27	0.53	NO	--	-- / --	--	--	--	NO
Other Parameters																			
Chromium (hexavalent) (MG/KG)	0.025 - 0.12	0 / 27	--	--	--	0.016	0.013	0.020	0.014	0.40	-- / --	0.30	NO	--	-- / --	--	--	--	NO
pH	-- - --	27 / 27	7.60	8.20	VEECA-4SMI08-0211	7.89	0.17	7.95	7.89	--	-- -- --	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC

TABLE L-26
Screening Statistics - ECA Surface Soil (SMI, 0 - 2 inches) - Mammal/Bird Eco-SSLs
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	95% UCL (Norm)	Arithmetic Mean	Mammal Eco-SSL	Frequency of Exceedance	Maximum Hazard Quotient	95% UCL Hazard Quotient	Mean Hazard Quotient	Bird Eco-SSL	Frequency of Exceedance	Maximum Hazard Quotient	95% UCL Hazard Quotient	Mean Hazard Quotient
Inorganics (MG/KG)															
Antimony	10.0 - 10.0	0 / 27	--	5.00	5.00	0.27	0 / 27	37.0	18.5	18.5	--	-- / --	--	--	--
Arsenic	3.00 - 3.00	23 / 27	36.1	12.1	9.44	46.0	0 / 27	0.78	0.26	0.21	43.0	0 / 27	0.84	0.28	0.22
Barium	-- - --	27 / 27	73.2	31.7	26.8	2,000	0 / 27	0.04	0.02	0.01	--	-- / --	--	--	--
Beryllium	0.50 - 0.50	17 / 27	0.97	0.35	0.29	21.0	0 / 27	0.05	0.02	0.01	--	-- / --	--	--	--
Cadmium	0.50 - 0.50	14 / 27	0.46	0.26	0.24	0.36	1 / 27	1.28	0.71	0.65	0.77	0 / 27	0.60	0.33	0.31
Chromium	-- - --	27 / 27	59.4	35.2	30.4	34.0	13 / 27	1.75	1.03	0.89	26.0	19 / 27	2.28	1.35	1.17
Cobalt	2.50 - 2.50	23 / 27	12.5	6.90	5.81	230	0 / 27	0.05	0.03	0.03	120	0 / 27	0.10	0.06	0.05
Copper	2.50 - 2.50	25 / 27	24.8	18.5	16.0	49.0	0 / 27	0.51	0.38	0.33	28.0	0 / 27	0.89	0.66	0.57
Lead	2.50 - 5.00	13 / 27	15.0	4.04	2.99	56.0	0 / 27	0.27	0.07	0.05	11.0	1 / 27	1.36	0.37	0.27
Manganese	-- - --	27 / 27	838	509	428	4,000	0 / 27	0.21	0.13	0.11	4,300	0 / 27	0.19	0.12	0.10
Nickel	2.50 - 2.50	23 / 27	17.1	10.6	9.11	130	0 / 27	0.13	0.08	0.07	210	0 / 27	0.08	0.05	0.04
Selenium	2.00 - 2.00	19 / 27	2.20	1.25	1.11	0.63	17 / 27	3.49	1.99	1.76	1.20	8 / 27	1.83	1.04	0.93
Silver	1.00 - 1.00	0 / 27	--	0.50	0.50	14.0	0 / 27	0.07	0.04	0.04	4.20	0 / 27	0.24	0.12	0.12
Vanadium	-- - --	27 / 27	71.4	48.1	41.1	280	0 / 27	0.26	0.17	0.15	7.80	23 / 27	9.15	6.17	5.26
Zinc	5.00 - 5.00	25 / 27	63.8	32.1	27.2	79.0	0 / 27	0.81	0.41	0.34	46.0	1 / 27	1.39	0.70	0.59

Shaded cells indicate HQ > 1

TABLE L-27
Hazard Quotients for Terrestrial Food Web Exposures - Step 2 (Screening) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

	Norway Rat			Indian Mongoose			Fruit Bat			Velvet Free-Tailed Bat			Pearly-eyed Thrasher			Red-tailed Hawk			Common Ground Dove			Cave Swallow		
Chemical	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																								
Antimony**	1.25E+00	3.96E-01	1.25E-01	2.50E+01	7.90E+00	2.50E+00	3.28E-01	1.04E-01	3.28E-02	4.03E+01	1.27E+01	4.03E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	4.54E-01	1.43E-01	4.54E-02	3.49E+00	1.10E+00	3.49E-01	3.30E-01	1.04E-01	3.30E-02	5.78E+00	1.83E+00	5.78E-01	2.65E+00	1.18E+00	5.30E-01	5.97E-03	2.67E-03	1.19E-03	3.57E-01	1.60E-01	7.14E-02	3.88E+00	1.73E+00	7.75E-01
Chromium	5.99E-01	2.68E-01	1.20E-01	1.13E+01	5.06E+00	2.26E+00	3.53E-01	1.58E-01	7.05E-02	1.86E+01	8.32E+00	3.72E+00	1.49E+01	6.66E+00	2.98E+00	3.22E-01	1.44E-01	6.44E-02	1.05E+00	4.71E-01	2.11E-01	2.15E+01	9.61E+00	4.30E+00
Lead	3.62E-01	2.63E-01	1.91E-01	7.09E-01	5.15E-01	3.75E-01	2.54E-01	1.84E-01	1.34E-01	1.15E+00	8.39E-01	6.10E-01	1.27E+00	5.68E-01	2.54E-01	4.60E-02	2.06E-02	9.20E-03	1.66E+00	1.17E+00	8.28E-01	1.81E+00	8.07E-01	3.61E-01
Selenium	7.74E+00	6.03E+00	4.69E+00	2.16E+00	1.68E+00	1.31E+00	5.62E+00	4.38E+00	3.41E+00	3.50E+00	2.73E+00	2.12E+00	1.44E+00	7.81E-01	4.23E-01	2.61E-01	1.41E-01	7.65E-02	8.03E+00	5.69E+00	4.02E+00	2.04E+00	1.10E+00	5.98E-01
Vanadium	1.20E-01	8.49E-02	6.01E-02	2.87E-01	2.03E-01	1.44E-01	2.83E-02	2.00E-02	1.41E-02	3.59E-01	2.54E-01	1.80E-01	5.87E+00	4.15E+00	2.94E+00	1.12E-01	7.95E-02	5.62E-02	4.47E+00	3.16E+00	2.24E+00	5.56E+00	3.93E+00	2.78E+00
Zinc	3.62E-01	1.62E-01	7.23E-02	1.57E+00	7.00E-01	3.13E-01	2.61E-01	1.17E-01	5.23E-02	2.59E+00	1.16E+00	5.18E-01	2.59E+00	1.16E+00	5.19E-01	1.11E-01	4.96E-02	2.22E-02	6.25E-01	2.79E-01	1.25E-01	3.79E+00	1.69E+00	7.57E-01
Explosives																								
1,3,5-Trinitrobenzene	1.08E-03	4.77E-04	2.12E-04	6.70E-04	2.97E-04	1.32E-04	7.72E-04	3.42E-04	1.52E-04	1.08E-03	4.79E-04	2.12E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	7.39E-04	3.44E-04	1.60E-04	1.10E-04	5.14E-05	2.40E-05	5.38E-04	2.51E-04	1.17E-04	1.78E-04	8.29E-05	3.86E-05	2.83E-03	1.51E-03	8.09E-04	0.00E+00	0.00E+00	0.00E+00	1.92E-02	1.03E-02	5.50E-03	3.96E-03	2.12E-03	1.13E-03
HMX	4.64E-04	2.93E-04	1.86E-04	1.33E-04	8.39E-05	5.31E-05	3.36E-04	2.13E-04	1.34E-04	2.14E-04	1.35E-04	8.56E-05	7.44E-04	2.35E-04	7.44E-05	0.00E+00	0.00E+00	0.00E+00	2.66E-03	8.41E-04	2.66E-04	1.04E-03	3.29E-04	1.04E-04
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	4.64E-03	2.08E-03	9.29E-04	3.69E-05	1.65E-05	7.37E-06	3.40E-03	1.52E-03	6.79E-04	5.94E-05	2.66E-05	1.19E-05	2.68E-05	1.89E-05	1.34E-05	0.00E+00	0.00E+00	0.00E+00	3.40E-03	2.41E-03	1.70E-03	3.75E-05	2.65E-05	1.87E-05

** - Concentration based on detection limits; chemical not detected

NA - TRV Not Available

Shaded cells indicate HQ > 1

TABLE L-28
Hazard Quotients for Terrestrial Food Web Exposures - Step 3A (Baseline) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

	Norway Rat			Indian Mongoose			Fruit Bat			Velvet Free-Tailed Bat			Pearly-eyed Thrasher			Common Ground Dove			Cave Swallow		
Chemical	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																					
Antimony**	4.44E+00	1.40E+00	4.44E-01	3.45E+00	1.09E+00	3.45E-01	3.26E-01	1.03E-01	3.26E-02	1.45E+01	4.57E+00	1.45E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1.96E-01	6.20E-02	1.96E-02	1.16E-01	3.66E-02	1.16E-02	4.13E-02	1.30E-02	4.13E-03	6.20E-01	1.96E-01	6.20E-02	1.76E-01	7.86E-02	3.51E-02	4.27E-02	1.91E-02	8.53E-03	4.55E-01	2.04E-01	9.10E-02
Chromium	2.87E-01	1.28E-01	5.73E-02	1.89E-01	8.46E-02	3.78E-02	6.48E-02	2.90E-02	1.30E-02	8.00E-01	3.58E-01	1.60E-01	4.63E-01	2.07E-01	9.27E-02	2.52E-01	1.13E-01	5.04E-02	1.01E+00	4.53E-01	2.03E-01
Lead	3.34E-02	2.43E-02	1.76E-02	2.50E-02	1.82E-02	1.32E-02	1.33E-02	9.67E-03	7.03E-03	9.01E-02	6.55E-02	4.76E-02	6.69E-02	2.99E-02	1.34E-02	9.90E-02	7.00E-02	4.95E-02	1.54E-01	6.90E-02	3.09E-02
Selenium	4.37E-01	3.40E-01	2.65E-01	2.53E-01	1.97E-01	1.54E-01	3.51E-01	2.73E-01	2.13E-01	9.33E-01	7.27E-01	5.66E-01	2.73E-01	1.48E-01	8.00E-02	5.03E-01	3.56E-01	2.52E-01	5.95E-01	3.22E-01	1.75E-01
Vanadium	4.76E-02	3.37E-02	2.38E-02	3.35E-02	2.37E-02	1.68E-02	5.97E-03	4.23E-03	2.99E-03	7.69E-02	5.44E-02	3.85E-02	1.27E+00	8.95E-01	6.33E-01	1.63E+00	1.16E+00	8.17E-01	1.30E+00	9.22E-01	6.52E-01
Zinc	1.94E-01	8.69E-02	3.89E-02	1.35E-01	6.05E-02	2.70E-02	4.73E-02	2.12E-02	9.47E-03	6.04E-01	2.70E-01	1.21E-01	3.75E-01	1.68E-01	7.51E-02	1.07E-01	4.79E-02	2.14E-02	9.66E-01	4.32E-01	1.93E-01

** - Concentration based on detection limits; chemical not detected

NA - TRV Not Available

Shaded cells indicate HQ > 1

TABLE L-29
Hazard Quotients for Terrestrial Food Web Exposures - Step 3A (Baseline) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Norway Rat			Indian Mongoose			Fruit Bat			Velvet Free-Tailed Bat			Pearly-eyed Thrasher			Common Ground Dove			Cave Swallow		
	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																					
Antimony**	4.44E+00	1.40E+00	4.44E-01	3.45E+00	1.09E+00	3.45E-01	3.26E-01	1.03E-01	3.26E-02	1.45E+01	4.57E+00	1.45E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1.84E-01	5.82E-02	1.84E-02	1.08E-01	3.43E-02	1.08E-02	3.94E-02	1.25E-02	3.94E-03	5.80E-01	1.84E-01	5.80E-02	1.65E-01	7.37E-02	3.29E-02	4.07E-02	1.82E-02	8.14E-03	4.26E-01	1.91E-01	8.53E-02
Chromium	2.48E-01	1.11E-01	4.95E-02	1.64E-01	7.35E-02	3.28E-02	5.60E-02	2.50E-02	1.12E-02	6.92E-01	3.09E-01	1.38E-01	4.00E-01	1.79E-01	8.01E-02	2.18E-01	9.74E-02	4.36E-02	8.76E-01	3.92E-01	1.75E-01
Lead	2.65E-02	1.93E-02	1.40E-02	2.02E-02	1.47E-02	1.07E-02	1.12E-02	8.17E-03	5.94E-03	7.07E-02	5.14E-02	3.73E-02	5.25E-02	2.35E-02	1.05E-02	8.09E-02	5.72E-02	4.04E-02	1.21E-01	5.41E-02	2.42E-02
Selenium	3.93E-01	3.06E-01	2.38E-01	2.33E-01	1.82E-01	1.41E-01	3.07E-01	2.39E-01	1.86E-01	8.55E-01	6.65E-01	5.18E-01	2.48E-01	1.34E-01	7.27E-02	4.41E-01	3.12E-01	2.21E-01	5.45E-01	2.95E-01	1.60E-01
Vanadium	4.06E-02	2.87E-02	2.03E-02	2.86E-02	2.02E-02	1.43E-02	5.10E-03	3.61E-03	2.55E-03	6.56E-02	4.64E-02	3.29E-02	1.08E+00	7.64E-01	5.40E-01	1.39E+00	9.86E-01	6.97E-01	1.11E+00	7.87E-01	5.57E-01
Zinc	1.83E-01	8.20E-02	3.67E-02	1.29E-01	5.76E-02	2.58E-02	4.32E-02	1.93E-02	8.64E-03	5.72E-01	2.56E-01	1.14E-01	3.55E-01	1.59E-01	7.10E-02	9.74E-02	4.36E-02	1.95E-02	9.15E-01	4.09E-01	1.83E-01

** - Concentration based on detection limits; chemical not detected

NA - TRV Not Available

Shaded cells indicate HQ > 1

TABLE L-30
Screening Statistics - ECA Discrete Deeper Surface Soil (2 - up to 24 inches) - Lagoon Fringe
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	Background UTL	Frequency of UTL Exceedance	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient	Step 3A COPC?
Explosives (UG/KG)																			
1,3,5-Trinitrobenzene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
1,3-Dinitrobenzene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
2,4,6-Trinitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
2,4-Dinitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	11,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
2,6-Dinitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	8,500	-- / --	0.004	NO	--	-- / --	--	--	--	NO
2-Amino-4,6-dinitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	80,000	-- / --	0.0004	NO	--	-- / --	--	--	--	NO
2-Nitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3,5-Dinitroaniline	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3-Nitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Amino-2,6-dinitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Nitrotoluene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
HMX	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Nitrobenzene	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	2,260	-- / --	0.01	NO	--	-- / --	--	--	--	NO
Nitroglycerin	58.0 - 60.0	0 / 5	--	--	--	29.6	0.42	30.0	29.6	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Perchlorate	0.44 - 0.51	0 / 5	--	--	--	0.24	0.017	0.26	0.24	1,000	-- / --	0.001	NO	--	-- / --	--	--	--	NO
PETN	58.0 - 60.0	0 / 5	--	--	--	29.6	0.42	30.0	29.6	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
RDX	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Tetryl	29.0 - 30.0	0 / 5	--	--	--	14.9	0.22	15.1	14.9	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	5 / 5	975	20,200	VEECA-3SB03-0002-0211	8,205	9,162	16,940	4,106	pH <5.5	0 / 5	--	NO	--	-- / --	--	--	--	NO
Antimony	2.20 - 2.70	0 / 5	--	--	--	1.24	0.096	1.33	1.24	78.0	-- / --	0.03	NO	--	-- / --	--	--	--	NO
Arsenic	1.70 - 2.00	2 / 5	7.10	13.5	VEECA-3SB02-0001-0211	4.68	5.61	10.0	2.39	18.0	0 / 5	0.75	NO	--	-- / --	--	--	--	NO
Barium	-- - --	5 / 5	8.10	21.9	VEECA-3SB03-0002-0211	12.6	5.49	17.8	11.8	330	0 / 5	0.07	NO	--	-- / --	--	--	--	NO
Beryllium	0.11 - 0.13	2 / 5	0.13	0.18	VEECA-3SB03-0002-0211	0.099	0.054	0.15	0.089	40.0	0 / 5	0.005	NO	--	-- / --	--	--	--	NO
Cadmium	0.11 - 0.13	1 / 5	0.063	0.063	VEECA-3SB04-001H-0211	0.062	0.0042	0.066	0.061	32.0	0 / 5	0.002	NO	--	-- / --	--	--	--	NO
Calcium [3]	-- - --	5 / 5	164,000	338,000	VEECA-3SB04-001H-0211	268,600	88,870	353,327	255,415	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Chromium	-- - --	5 / 5	6.70	37.5	VEECA-3SB03-0002-0211	18.4	14.7	32.5	14.1	64.0	0 / 5	0.59	NO	--	-- / --	--	--	--	NO
Cobalt	0.56 - 0.56	4 / 5	0.36	9.10	VEECA-3SB03-0002-0211	3.39	4.21	7.40	1.25	13.0	0 / 5	0.70	NO	--	-- / --	--	--	--	NO
Copper	-- - --	5 / 5	2.20	20.3	VEECA-3SB03-0002-0211	8.44	8.04	16.1	5.68	70.0	0 / 5	0.29	NO	--	-- / --	--	--	--	NO
Iron	-- - --	5 / 5	1,560	21,500	VEECA-3SB03-0002-0211	9,248	9,273	18,089	5,382	5 < pH > 8	0 / 5	--	NO	--	-- / --	--	--	--	NO
Lead	0.56 - 3.30	0 / 5	--	--	--	0.82	0.71	1.50	0.59	120	-- / --	0.03	NO	--	-- / --	--	--	--	NO
Magnesium [3]	-- - --	5 / 5	6,310	10,400	VEECA-3SB04-001H-0211	8,642	1,900	10,454	8,466	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Manganese	-- - --	5 / 5	46.7	537	VEECA-3SB03-0002-0211	167	211	369	100	220	1 / 5	2.44	YES	1,630	0 / 5	0.33	--	--	NO
Nickel	-- - --	5 / 5	0.49	11.2	VEECA-3SB03-0002-0211	4.73	5.38	9.86	2.19	38.0	0 / 5	0.29	NO	--	-- / --	--	--	--	NO
Potassium [3]	-- - --	5 / 5	240	4,500	VEECA-3SB02-0001-0211	1,934	2,070	3,908	1,033	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Selenium	1.30 - 1.30	4 / 5	0.40	0.70	VEECA-3SB01-0001-0211	0.57	0.12	0.68	0.56	0.52	3 / 5	1.35	YES	1.30	0 / 5	0.54	--	--	NO
Silver	0.22 - 0.27	0 / 5	--	--	--	0.12	0.0096	0.13	0.12	560	-- / --	0.0005	NO	--	-- / --	--	--	--	NO
Sodium [3]	-- - --	5 / 5	2,720	4,570	VEECA-3SB02-0001-0211	3,724	813	4,499	3,649	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Thallium	0.11 - 0.13	2 / 5	0.077	0.093	VEECA-3SB02-0001-0211	0.071	0.015	0.085	0.070	1.00	0 / 5	0.09	NO	--	-- / --	--	--	--	NO
Vanadium	-- - --	5 / 5	4.40	66.7	VEECA-3SB03-0002-0211	26.6	29.3	54.5	14.0	130	0 / 5	0.51	NO	--	-- / --	--	--	--	NO
Zinc	-- - --	5 / 5	3.00	26.4	VEECA-3SB03-0002-0211	11.4	10.6	21.5	7.66	120	0 / 5	0.22	NO	--	-- / --	--	--	--	NO
Other Parameters																			
Chromium (hexavalent) (MG/KG)	0.028 - 0.033	0 / 5	--	--	--	0.016	0.001	0.016	0.015	0.40	-- / --	0.08	NO	--	-- / --	--	--	--	NO
pH	-- - --	5 / 5	7.70	7.90	VEECA-3SB01-0001-0211	7.82	0.11	7.92	7.82	--	-- / --	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC

TABLE L-31
Screening Statistics - ECA Discrete Deeper Surface Soil (18 - 24 inches) - Beach
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	Background UTL	Frequency of UTL Exceedance	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient	Step 3A COPC?
Explosives (UG/KG)																			
1,3,5-Trinitrobenzene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
1,3-Dinitrobenzene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
2,4,6-Trinitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
2,4-Dinitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	11,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
2,6-Dinitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	8,500	-- / --	0.004	NO	--	-- / --	--	--	--	NO
2-Amino-4,6-dinitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	80,000	-- / --	0.0004	NO	--	-- / --	--	--	--	NO
2-Nitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3,5-Dinitroaniline	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3-Nitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Amino-2,6-dinitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Nitrotoluene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
HMX	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Nitrobenzene	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	2,260	-- / --	0.01	NO	--	-- / --	--	--	--	NO
Nitroglycerin	59.0 - 60.0	0 / 2	--	--	--	29.8	0.35	31.3	29.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Perchlorate	0.41 - 0.42	0 / 2	--	--	--	0.21	0.0035	0.22	0.21	1,000	-- / --	0.0004	NO	--	-- / --	--	--	--	NO
PETN	59.0 - 60.0	0 / 2	--	--	--	29.8	0.35	31.3	29.7	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
RDX	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Tetryl	29.0 - 30.0	0 / 2	--	--	--	14.8	0.35	16.3	14.7	10,000	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	2 / 2	380	402	VEECA-1SB01-1H02-0211	391	15.6	460	391	pH <5.5	0 / 1	--	NO	--	-- / --	--	--	--	NO
Antimony	2.00 - 2.10	0 / 2	--	--	--	1.03	0.035	1.18	1.02	78.0	-- / --	0.03	NO	--	-- / --	--	--	--	NO
Arsenic	7.70 - 7.80	0 / 2	--	--	--	3.88	0.035	4.03	3.87	18.0	-- / --	0.43	NO	--	-- / --	--	--	--	NO
Barium	-- - --	2 / 2	6.10	6.60	VEECA-1SB01-1H02-0211	6.35	0.35	7.93	6.35	330	0 / 2	0.02	NO	--	-- / --	--	--	--	NO
Beryllium	0.10 - 0.10	0 / 2	--	--	--	0.050	0.0	0.050	0.050	40.0	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Cadmium	0.10 - 0.10	0 / 2	--	--	--	0.050	0.0	0.050	0.050	32.0	-- / --	0.003	NO	--	-- / --	--	--	--	NO
Calcium [3]	-- - --	2 / 2	312,000	318,000	VEECA-1SB01-1H02-0211	315,000	4,243	333,941	314,986	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Chromium	-- - --	2 / 2	6.90	7.00	VEECA-1SB01-1H02-0211	6.95	0.071	7.27	6.95	64.0	0 / 2	0.11	NO	--	-- / --	--	--	--	NO
Cobalt	0.51 - 0.52	0 / 2	--	--	--	0.26	0.0035	0.27	0.26	13.0	-- / --	0.04	NO	--	-- / --	--	--	--	NO
Copper	-- - --	2 / 2	0.66	0.76	VEECA-1SB01-1H02-0211	0.71	0.071	1.03	0.71	70.0	0 / 2	0.01	NO	--	-- / --	--	--	--	NO
Iron	-- - --	2 / 2	675	696	VEECA-1SB02-1H02-0211	686	14.8	752	685	5 < pH > 8	1 / 1	--	YES	38,100	0 / 2	0.02	--	--	NO
Lead	0.51 - 2.60	0 / 2	--	--	--	0.78	0.74	4.08	0.58	120	-- / --	0.02	NO	--	-- / --	--	--	--	NO
Magnesium [3]	-- - --	2 / 2	13,900	14,200	VEECA-1SB01-1H02-0211	14,050	212	14,997	14,049	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Manganese	-- - --	2 / 2	24.8	25.9	VEECA-1SB01-1H02-0211	25.4	0.78	28.8	25.3	220	0 / 2	0.12	NO	--	-- / --	--	--	--	NO
Nickel	-- - --	2 / 2	0.26	0.30	VEECA-1SB01-1H02-0211	0.28	0.028	0.41	0.28	38.0	0 / 2	0.01	NO	--	-- / --	--	--	--	NO
Potassium [3]	-- - --	2 / 2	107	107	VEECA-1SB01-1H02-0211	107	0.0	107	107	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Selenium	5.10 - 5.20	0 / 2	--	--	--	2.58	0.035	2.73	2.57	0.52	-- / --	10.0	YES	--	-- / --	--	5.26	4.95	NO[4]
Silver	0.20 - 0.21	0 / 2	--	--	--	0.10	0.0035	0.12	0.10	560	-- / --	0.0004	NO	--	-- / --	--	--	--	NO
Sodium [3]	-- - --	2 / 2	2,160	2,180	VEECA-1SB01-1H02-0211	2,170	14.1	2,233	2,170	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Thallium	0.10 - 0.10	0 / 2	--	--	--	0.050	0.0	0.050	0.050	1.00	-- / --	0.10	NO	--	-- / --	--	--	--	NO
Vanadium	-- - --	2 / 2	3.40	3.60	VEECA-1SB02-1H02-0211	3.50	0.14	4.13	3.50	130	0 / 2	0.03	NO	--	-- / --	--	--	--	NO
Zinc	-- - --	2 / 2	0.57	0.69	VEECA-1SB01-1H02-0211	0.63	0.085	1.01	0.63	120	0 / 2	0.01	NO	--	-- / --	--	--	--	NO
Other Parameters																			
Chromium (hexavalent) (MG/KG)	0.026 - 0.026	0 / 2	--	--	--	0.013	0.0	0.013	0.013	0.40	-- / --	0.07	NO	--	-- / --	--	--	--	NO
pH	-- - --	1 / 1	8.80	8.80	VEECA-1SB01-1H02-0211	8.80	--	--	8.80	--	-- / --	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC
4 - See the uncertainty section

TABLE L-32
Screening Statistics - ECA Discrete Deeper Surface Soil (2 - 18 inches) - Upland
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	Background UTL	Frequency of UTL Exceedance	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient	Step 3A COPC?
Explosives (UG/KG)																			
1,3,5-Trinitrobenzene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
1,3-Dinitrobenzene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
2,4,6-Trinitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	10,000	-- / --	0.002	NO	--	-- / --	--	--	--	NO
2,4-Dinitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	11,000	-- / --	0.001	NO	--	-- / --	--	--	--	NO
2,6-Dinitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	8,500	-- / --	0.002	NO	--	-- / --	--	--	--	NO
2-Amino-4,6-dinitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	80,000	-- / --	0.0002	NO	--	-- / --	--	--	--	NO
2-Nitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3,5-Dinitroaniline	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
3-Nitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Amino-2,6-dinitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
4-Nitrotoluene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
HMX	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	10,000	-- / --	0.002	NO	--	-- / --	--	--	--	NO
Nitrobenzene	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	2,260	-- / --	0.007	NO	--	-- / --	--	--	--	NO
Nitroglycerin	59.0 - 59.0	0 / 1	--	--	--	29.5	--	--	29.5	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Perchlorate	0.50 - 0.50	0 / 1	--	--	--	0.25	--	--	0.25	1,000	-- / --	0.0003	NO	--	-- / --	--	--	--	NO
PETN	59.0 - 59.0	0 / 1	--	--	--	29.5	--	--	29.5	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
RDX	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	10,000	-- / --	0.002	NO	--	-- / --	--	--	--	NO
Tetryl	30.0 - 30.0	0 / 1	--	--	--	15.0	--	--	15.0	10,000	-- / --	0.002	NO	--	-- / --	--	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	1 / 1	7,700	7,700	VEECA-4SB01-001H-0211	7,700	--	--	7,700	pH <5.5	0 / 1	--	NO	--	-- / --	--	--	--	NO
Antimony	2.50 - 2.50	0 / 1	--	--	--	1.25	--	--	1.25	78.0	-- / --	0.02	NO	--	-- / --	--	--	--	NO
Arsenic	-- - --	1 / 1	5.9	5.9	VEECA-4SB01-001H-0211	5.9	--	--	5.9	18.0	0 / 1	0.33	NO	--	-- / --	--	--	--	NO
Barium	-- - --	1 / 1	15.5	15.5	VEECA-4SB01-001H-0211	15.5	--	--	15.5	330	0 / 1	0.05	NO	--	-- / --	--	--	--	NO
Beryllium	0.13 - 0.13	0 / 1	--	--	--	0.07	--	--	0.07	40.0	-- / --	0.002	NO	--	-- / --	--	--	--	NO
Cadmium	-- - --	1 / 1	0.1	0.1	VEECA-4SB01-001H-0211	0.1	--	--	0.1	32.0	0 / 1	0.003	NO	--	-- / --	--	--	--	NO
Calcium [3]	-- - --	1 / 1	282,000	282,000	VEECA-4SB01-001H-0211	282,000	--	--	282,000	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Chromium	-- - --	1 / 1	22.5	22.5	VEECA-4SB01-001H-0211	22.5	--	--	22.5	64.0	0 / 1	0.35	NO	--	-- / --	--	--	--	NO
Cobalt	-- - --	1 / 1	5.9	5.9	VEECA-4SB01-001H-0211	5.9	--	--	5.9	13.0	0 / 1	0.45	NO	--	-- / --	--	--	--	NO
Copper	-- - --	1 / 1	12.1	12.1	VEECA-4SB01-001H-0211	12.1	--	--	12.1	70.0	0 / 1	0.17	NO	--	-- / --	--	--	--	NO
Iron	-- - --	1 / 1	11,800	11,800	VEECA-4SB01-001H-0211	11,800	--	--	11,800	5 < pH > 8	1 / 1	--	YES	38,100	0 / 1	0.31	--	--	NO
Lead	3.20 - 3.20	0 / 1	--	--	--	1.6	--	--	1.6	120	-- / --	0.01	NO	--	-- / --	--	--	--	NO
Magnesium [3]	-- - --	1 / 1	5,430	5,430	VEECA-4SB01-001H-0211	5,430	--	--	5,430	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Manganese	-- - --	1 / 1	646	646	VEECA-4SB01-001H-0211	646	--	--	646	220	1 / 1	2.94	YES	1,630	0 / 1	0.40	--	--	NO
Nickel	-- - --	1 / 1	6.0	6.0	VEECA-4SB01-001H-0211	6.0	--	--	6.0	38.0	0 / 1	0.16	NO	--	-- / --	--	--	--	NO
Potassium [3]	-- - --	1 / 1	2,000	2,000	VEECA-4SB01-001H-0211	2,000	--	--	2,000	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Selenium	1.30 - 1.30	0 / 1	--	--	--	0.65	--	--	0.65	0.52	-- / --	1.25	YES	--	-- / --	--	--	1.25	NO[4]
Silver	-- - --	1 / 1	0.12	0.12	VEECA-4SB01-001H-0211	0.12	--	--	0.12	560	0 / 1	0.0002	NO	--	-- / --	--	--	--	NO
Sodium [3]	-- - --	1 / 1	3,870	3,870	VEECA-4SB01-001H-0211	3,870	--	--	3,870	NSV	-- / --	NSV	NO	--	-- / --	--	--	--	NO
Thallium	0.64 - 0.64	0 / 1	--	--	--	0.32	--	--	0.32	1.00	-- / --	0.32	NO	--	-- / --	--	--	--	NO
Vanadium	-- - --	1 / 1	53.9	53.9	VEECA-4SB01-001H-0211	53.9	--	--	53.9	130	0 / 1	0.41	NO	--	-- / --	--	--	--	NO
Zinc	-- - --	1 / 1	18.0	18.0	VEECA-4SB01-001H-0211	18.0	--	--	18.0	120	0 / 1	0.15	NO	--	-- / --	--	--	--	NO
Other Parameters																			
Chromium (hexavalent) (MG/KG)	0.032 - 0.032	0 / 1	--	--	--	0.016	--	--	0.016	0.40	-- / --	0.04	NO	--	-- / --	--	--	--	NO
pH	-- - --	1 / 1	8.10	8.10	VEECA-4SB01-001H-0211	8.10	--	--	8.10	--	-- / --	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC
4 - See the uncertainty section

TABLE L-33
Screening Statistics - Surface Water - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	COPC for Risk Evaluation?
Explosives (UG/L)																
1,3,5-Trinitrobenzene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	15.0	-- / --	0.003	NO	--	--	NO
1,3-Dinitrobenzene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	180	-- / --	0.0003	NO	--	--	NO
2,4,6-Trinitrotoluene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	100	-- / --	0.001	NO	--	--	NO
2,4-Dinitrotoluene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	480	-- / --	0.0001	NO	--	--	NO
2,6-Dinitrotoluene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	1,000	-- / --	0.0001	NO	--	--	NO
2-Amino-4,6-dinitrotoluene	0.099 - 0.10	0 / 5	--	--	--	0.050	0.0002	0.050	0.050	NSV	-- / --	NSV	NO	--	--	NO
2-Nitrotoluene	0.099 - 0.10	0 / 5	--	--	--	0.050	0.0002	0.050	0.050	NSV	-- / --	NSV	NO	--	--	NO
3,5-Dinitroaniline	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	NSV	-- / --	NSV	NO	--	--	NO
3-Nitrotoluene	0.099 - 0.10	0 / 5	--	--	--	0.050	0.0002	0.050	0.050	NSV	-- / --	NSV	NO	--	--	NO
4-Amino-2,6-dinitrotoluene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	NSV	-- / --	NSV	NO	--	--	NO
4-Nitrotoluene	0.099 - 0.10	0 / 5	--	--	--	0.050	0.0002	0.050	0.050	1,900 **	-- / --	0.0001	NO	--	--	NO
HMX	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	NSV	-- / --	NSV	NO	--	--	NO
Nitrobenzene	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	66.8	-- / --	0.001	NO	--	--	NO
Nitroglycerin	0.50 - 0.52	0 / 5	--	--	--	0.26	0.0050	0.26	0.25	NSV	-- / --	NSV	NO	--	--	NO
Perchlorate	0.25 - 0.25	0 / 5	--	--	--	0.13	0.0	0.13	0.13	NSV	-- / --	NSV	NO	--	--	NO
PETN	0.50 - 0.52	0 / 5	--	--	--	0.26	0.0050	0.26	0.25	NSV	-- / --	NSV	NO	--	--	NO
RDX	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	5,000	-- / --	0.00001	NO	--	--	NO
Tetryl	0.050 - 0.052	0 / 5	--	--	--	0.026	0.0005	0.026	0.025	8.00	-- / --	0.01	NO	--	--	NO
Inorganics (UG/L)																
Aluminum	-- - --	5 / 5	2,010	2,990	VEECA-5SW03-0211	2,496	444	2,920	2,463	87.0 **	5 / 5	34.4	YES	33.6	28.7	NO
Antimony	4.00 - 4.00	0 / 5	--	--	--	2.00	0.0	2.00	2.00	500	-- / --	0.01	NO	--	--	NO
Arsenic	-- - --	5 / 5	1.40	2.00	VEECA-5SW01-0211	1.70	0.25	1.94	1.68	36.0	0 / 5	0.06	NO	--	--	NO
Barium	-- - --	5 / 5	67.6	72.4	VEECA-5SW01-0211	70.5	2.17	72.5	70.4	200	0 / 5	0.36	NO	--	--	NO
Beryllium	10.0 - 10.0	0 / 5	--	--	--	5.00	0.0	5.00	5.00	100	-- / --	0.10	NO	--	--	NO
Cadmium	0.50 - 10.0	0 / 5	--	--	--	4.05	2.12	6.08	2.75	8.85	-- / --	1.13	YES	0.69	0.46	NO
Calcium [3]	-- - --	5 / 5	597,000	622,000	VEECA-5SW01-0211	608,200	9,391	617,154	608,142	NSV	-- / --	NSV	NO	--	--	NO
Chromium	-- - --	5 / 5	4.20	7.50	VEECA-5SW03-0211	5.60	1.29	6.83	5.49	50.4	0 / 5	0.15	NO	--	--	NO
Cobalt	-- - --	5 / 5	2.80	3.10	VEECA-5SW01-0211	2.96	0.11	3.07	2.96	23.0 **	0 / 5	0.13	NO	--	--	NO
Copper	-- - --	5 / 5	11.2	12.1	VEECA-5SW04-0211	11.7	0.37	12.1	11.7	3.73	5 / 5	3.24	YES	3.24	3.14	YES
Iron	-- - --	5 / 5	1,910	2,530	VEECA-5SW03-0211	2,118	248	2,354	2,107	50.0	5 / 5	50.6	YES	47.1	42.4	YES
Lead	1.00 - 1.00	0 / 5	--	--	--	0.50	0.0	0.50	0.50	8.52	-- / --	0.12	NO	--	--	NO
Magnesium [3]	-- - --	5 / 5	686,000	708,000	VEECA-5SW01-0211	698,000	7,842	705,477	697,965	NSV	-- / --	NSV	NO	--	--	NO
Manganese	-- - --	5 / 5	57.1	77.5	VEECA-5SW03-0211	67.6	9.00	76.1	67.1	100	0 / 5	0.78	NO	--	--	NO
Nickel	2.00 - 2.00	3 / 4	1.50	3.60	VEECA-5SW02-0211	2.08	1.13	3.40	1.86	8.28	0 / 4	0.43	NO	--	--	NO
Potassium [3]	-- - --	5 / 5	186,000	193,000	VEECA-5SW01-0211	188,800	2,950	191,612	188,782	NSV	-- / --	NSV	NO	--	--	NO
Selenium	2.50 - 5.00	2 / 4	2.90	17.0	VEECA-5SW01-0211	5.91	7.43	14.6	3.52	71.1	0 / 4	0.24	NO	--	--	NO
Silver	0.50 - 0.50	0 / 5	--	--	--	0.25	0.0	0.25	0.25	2.24	-- / --	0.22	NO	--	--	NO
Sodium [3]	-- - --	5 / 5	5,570,000	5,740,000	VEECA-5SW04-0211	5,652,000	73,621	5,722,189	5,651,617	NSV	-- / --	NSV	NO	--	--	NO
Thallium	1.00 - 1.00	2 / 5	0.54	0.70	VEECA-5SW04-0211	0.55	0.087	0.63	0.54	21.3	0 / 5	0.03	NO	--	--	NO
Vanadium	-- - --	5 / 5	11.3	14.0	VEECA-5SW01-0211	13.1	1.08	14.1	13.1	50.0	0 / 5	0.28	NO	--	--	NO
Zinc	100 - 100	0 / 5	--	--	--	50.0	0.0	50.0	50.0	85.6	-- / --	1.17	YES	0.58	0.58	NO

TABLE L-33
Screening Statistics - Surface Water - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	COPC for Risk Evaluation?
Dissolved Metals (UG/L)																
Aluminum	1,000 - 1,000	0 / 5	--	--	--	500	0.0	500	500	87.0 **	-- / --	11.5	YES	5.75	5.75	NO[4]
Antimony	4.00 - 4.00	0 / 5	--	--	--	2.00	0.0	2.00	2.00	500	-- / --	0.01	NO	--	--	NO
Arsenic	2.00 - 2.00	1 / 5	1.10	1.10	VEECA-5SW04-0211	1.02	0.045	1.06	1.02	36.0	0 / 5	0.03	NO	--	--	NO
Barium	-- - --	5 / 5	62.4	67.7	VEECA-5SW05-0211	64.5	1.96	66.4	64.5	200	0 / 5	0.34	NO	--	--	NO
Beryllium	10.0 - 10.0	0 / 5	--	--	--	5.00	0.0	5.00	5.00	100	-- / --	0.10	NO	--	--	NO
Cadmium	10.0 - 10.0	0 / 5	--	--	--	5.00	0.0	5.00	5.00	8.80	-- / --	1.14	YES	0.57	0.57	NO
Calcium [3]	-- - --	5 / 5	551,000	581,000	VEECA-5SW05-0211	565,600	12,462	577,481	565,490	NSV	-- / --	NSV	NO	--	--	NO
Chromium	4.00 - 4.00	0 / 5	--	--	--	2.00	0.0	2.00	2.00	50.0	-- / --	0.08	NO	--	--	NO
Cobalt	-- - --	5 / 5	1.80	2.00	VEECA-5SW04-0211	1.88	0.084	1.96	1.88	23.0 **	0 / 5	0.09	NO	--	--	NO
Copper	-- - --	5 / 5	9.90	10.5	VEECA-5SW04-0211	10.2	0.24	10.4	10.2	3.10	5 / 5	3.39	YES	3.36	3.28	YES
Iron	-- - --	5 / 5	40.9	252	VEECA-5SW05-0211	100	86.7	183	79.5	50.0	3 / 5	5.04	YES	3.66	2.00	YES
Lead	1.00 - 1.00	0 / 5	--	--	--	0.50	0.0	0.50	0.50	8.10	-- / --	0.12	NO	--	--	NO
Magnesium [3]	-- - --	5 / 5	652,000	686,000	VEECA-5SW02-0211	667,400	13,759	680,517	667,287	NSV	-- / --	NSV	NO	--	--	NO
Manganese	50.0 - 50.0	0 / 5	--	--	--	25.0	0.0	25.0	25.0	100	-- / --	0.50	NO	--	--	NO
Nickel	-- - --	4 / 4	1.20	3.90	VEECA-5SW05-0211	2.23	1.21	3.65	2.00	8.20	0 / 4	0.48	NO	--	--	NO
Potassium [3]	-- - --	5 / 5	177,000	187,000	VEECA-5SW05-0211	181,400	4,037	185,249	181,364	NSV	-- / --	NSV	NO	--	--	NO
Selenium	-- - --	4 / 4	12.8	27.0	VEECA-5SW01-0211	21.3	6.66	29.1	20.4	71.0	0 / 4	0.38	NO	--	--	NO
Silver	0.50 - 0.50	0 / 5	--	--	--	0.25	0.0	0.25	0.25	2.24	-- / --	0.22	NO	--	--	NO
Sodium [3]	-- - --	5 / 5	5,230,000	5,620,000	VEECA-5SW02-0211	5,382,000	166,343	5,540,590	5,379,964	NSV	-- / --	NSV	NO	--	--	NO
Thallium	1.00 - 1.00	0 / 5	--	--	--	0.50	0.0	0.50	0.50	21.3	-- / --	0.05	NO	--	--	NO
Vanadium	-- - --	5 / 5	3.40	5.50	VEECA-5SW02-0211	4.52	0.87	5.35	4.45	50.0	0 / 5	0.11	NO	--	--	NO
Zinc	100 - 100	0 / 5	--	--	--	50.0	0.0	50.0	50.0	81.0	-- / --	1.23	YES	0.62	0.62	NO
Other Parameters																
Chromium (hexavalent) (UG/L)	5.00 - 5.00	0 / 5	--	--	--	2.50	0.0	2.50	2.50	50.4	-- / --	0.10	NO	--	--	NO
Dissolved Other Parameters																
Chromium (hexavalent) (UG/L)	5.00 - 5.00	0 / 5	--	--	--	2.50	0.0	2.50	2.50	50.0	-- / --	0.10	NO	--	--	NO

NSV - No Screening Value
** - Freshwater screening value (from the final ERA Protocol) used for detected chemicals lacking marine surface water screening values
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC
4 - See the uncertainty section

TABLE L-34
Screening Statistics - Sediment - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient[2]	Step 2 COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	COPC for Risk Evaluation?
Explosives (UG/KG)																
1,3,5-Trinitrobenzene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	7,000	-- / --	0.004	NO	--	--	NO
1,3-Dinitrobenzene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
2,4,6-Trinitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	20,000	-- / --	0.002	NO	--	--	NO
2,4-Dinitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
2,6-Dinitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	549	-- / --	0.05	NO	--	--	NO
2-Amino-4,6-dinitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
2-Nitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
3,5-Dinitroaniline	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
3-Nitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
4-Amino-2,6-dinitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
4-Nitrotoluene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	NSV	-- / --	NSV	NO	--	--	NO
HMX	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	115,000	-- / --	0.0003	NO	--	--	NO
Nitrobenzene	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	21.0	-- / --	1.43	YES	0.71	0.71	NO
Nitroglycerin	58.0 - 61.0	0 / 15	--	--	--	29.8	0.46	30.0	29.8	NSV	-- / --	NSV	NO	--	--	NO
Perchlorate	0.50 - 0.74	0 / 15	--	--	--	0.28	0.028	0.29	0.28	NSV	-- / --	NSV	NO	--	--	NO
PETN	58.0 - 61.0	0 / 15	--	--	--	29.8	0.46	30.0	29.8	NSV	-- / --	NSV	NO	--	--	NO
RDX	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	891,000	-- / --	0.00003	NO	--	--	NO
Tetryl	29.0 - 30.0	0 / 15	--	--	--	14.9	0.21	15.0	14.9	72.0	-- / --	0.42	NO	--	--	NO
Inorganics (MG/KG)																
Aluminum	-- - --	15 / 15	7,180	20,000	VEECA-5SD05-000H-0211	14,443	4,165	16,337	13,778	18,000	2 / 15	1.11	YES	0.91	0.80	NO
Antimony	2.60 - 4.00	0 / 15	--	--	--	1.47	0.16	1.55	1.47	2.00	-- / --	2.00	YES	0.77	0.74	NO
Arsenic	2.00 - 2.20	13 / 15	1.60	3.30	VEECA-5SD01-000H-0211	2.13	0.66	2.43	2.03	8.20	0 / 15	0.40	NO	--	--	NO
Barium	-- - --	15 / 15	16.2	48.4	VEECA-5SD14-000H-0211	30.3	8.14	34.0	29.2	48.0	1 / 15	1.01	YES	0.71	0.63	NO
Beryllium	0.14 - 0.15	10 / 15	0.054	0.11	VEECA-5SD09-000H-0211	0.077	0.014	0.083	0.075	NSV	-- / --	NSV	YES	NSV	NSV	YES
Cadmium	0.15 - 0.15	14 / 15	0.046	0.16	VEECA-5SD01-000H-0211	0.083	0.040	0.10	0.076	1.20	0 / 15	0.13	NO	--	--	NO
Calcium [3]	-- - --	15 / 15	163,000	260,000	VEECA-5SD04-000H-0211	215,933	25,689	227,616	214,486	NSV	-- / --	NSV	NO	--	--	NO
Chromium	-- - --	15 / 15	17.7	35.5	VEECA-5SD05-000H-0211	27.7	5.93	30.4	27.0	81.0	0 / 15	0.44	NO	--	--	NO
Cobalt	-- - --	15 / 15	3.80	8.30	VEECA-5SD09-000H-0211	6.43	1.47	7.10	6.26	10.0	0 / 15	0.83	NO	--	--	NO
Copper	-- - --	15 / 15	8.90	25.9	VEECA-5SD09-000H-0211	15.3	4.57	17.3	14.7	34.0	0 / 15	0.76	NO	--	--	NO
Iron	-- - --	15 / 15	8,180	18,200	VEECA-5SD01-000H-0211	14,389	3,389	15,930	13,950	220,000	0 / 15	0.08	NO	--	--	NO
Lead	0.66 - 3.40	0 / 15	--	--	--	0.46	0.35	0.62	0.41	46.7	-- / --	0.07	NO	--	--	NO
Magnesium [3]	-- - --	15 / 15	8,750	17,900	VEECA-5SD05-000H-0211	13,835	3,166	15,275	13,451	NSV	-- / --	NSV	NO	--	--	NO
Manganese	-- - --	15 / 15	274	571	VEECA-5SD05-000H-0211	437	86.0	476	428	260	15 / 15	2.20	YES	1.83	1.68	YES
Nickel	-- - --	15 / 15	4.80	10.8	VEECA-5SD09-000H-0211	8.29	1.93	9.16	8.05	20.9	0 / 15	0.52	NO	--	--	NO
Potassium [3]	-- - --	15 / 15	1,730	6,490	VEECA-5SD09-000H-0211	4,644	1,687	5,411	4,270	NSV	-- / --	NSV	NO	--	--	NO
Selenium	-- - --	15 / 15	0.75	2.70	VEECA-5SD05-000H-0211	1.79	0.65	2.08	1.65	1.00	12 / 15	2.70	YES	2.08	1.79	YES
Silver	0.26 - 0.40	0 / 15	--	--	--	0.15	0.016	0.15	0.15	1.00	-- / --	0.40	NO	--	--	NO
Sodium [3]	-- - --	15 / 15	3,030	18,800	VEECA-5SD01-000H-0211	5,952	3,683	7,627	5,389	NSV	-- / --	NSV	NO	--	--	NO
Thallium	0.13 - 0.20	1 / 15	0.081	0.081	VEECA-5SD05-000H-0211	0.075	0.0080	0.078	0.074	NSV	-- / --	NSV	YES	NSV	NSV	YES
Vanadium	-- - --	15 / 15	27.0	62.3	VEECA-5SD15-000H-0211	44.3	9.63	48.7	43.3	57.0	1 / 15	1.09	YES	0.85	0.78	NO
Zinc	-- - --	15 / 15	12.4	28.4	VEECA-5SD01-000H-0211	20.8	5.31	23.2	20.1	150	0 / 15	0.19	NO	--	--	NO
Other Parameters																
Chromium (hexavalent) (MG/KG)	0.034 - 0.050	2 / 15	0.019	0.019	VEECA-5SD14-000H-0211	0.019	0.0019	0.020	0.019	NSV	-- / --	NSV	YES	NSV	NSV	YES
pH	-- - --	15 / 15	8.00	8.40	VEECA-5SD02-000H-0211	8.29	0.12	8.34	8.29	--	-- / --	--	--	--	--	--
Total organic carbon (MG/KG)	-- - --	15 / 15	4,620	31,100	VEECA-5SD11-000H-0211	15,195	7,941	18,807	13,149	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Shaded cells indicate hazard quotient based on reporting limits
3 - Macronutrient - Not considered to be a COPC

TABLE L-35
Hazard Quotients for Aquatic Food Web Exposures - Step 2 (Screening) - Maximum - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

	Green Heron			Spotted Sandpiper			White-cheeked Pintail			Cave Swallow			Fishing Bat			Velvet Free-Tailed Bat		
Chemical	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																		
Arsenic	1.50E-02	9.52E-03	6.02E-03	1.71E-01	1.08E-01	6.86E-02	9.30E-02	5.88E-02	3.72E-02	1.35E-01	8.53E-02	5.40E-02	3.67E-01	1.64E-01	7.34E-02	2.15E+00	9.60E-01	4.29E-01
Cadmium	4.45E-03	1.99E-03	8.91E-04	1.05E-01	4.70E-02	2.10E-02	4.55E-02	2.04E-02	9.10E-03	1.02E-01	4.55E-02	2.04E-02	1.02E-02	3.21E-03	1.02E-03	1.52E-01	4.80E-02	1.52E-02
Chromium	9.43E-02	4.22E-02	1.89E-02	2.69E+00	1.20E+00	5.38E-01	2.01E-01	8.97E-02	4.01E-02	1.90E+00	8.50E-01	3.80E-01	1.25E-01	5.59E-02	2.50E-02	1.65E+00	7.36E-01	3.29E-01
Copper	1.19E-01	6.88E-02	3.98E-02	1.53E+01	8.87E+00	5.13E+00	5.37E-01	3.11E-01	1.80E-01	1.55E+01	8.96E+00	5.19E+00	1.03E-01	7.96E-02	6.17E-02	8.75E+00	6.77E+00	5.24E+00
Lead **	2.14E-02	9.55E-03	4.27E-03	1.41E-01	6.32E-02	2.83E-02	5.65E-02	2.53E-02	1.13E-02	8.76E-02	3.92E-02	1.75E-02	2.09E-02	1.52E-02	1.10E-02	5.60E-02	4.07E-02	2.96E-02
Nickel	2.99E-01	1.34E-01	5.99E-02	2.05E-01	9.15E-02	4.09E-02	2.96E-01	1.32E-01	5.92E-02	1.05E-01	4.69E-02	2.10E-02	1.41E+00	9.99E-01	7.06E-01	3.23E-01	2.28E-01	1.62E-01
Selenium	2.79E-01	1.25E-01	5.58E-02	1.14E+01	8.08E+00	5.71E+00	2.62E+00	1.85E+00	1.31E+00	1.04E+01	5.62E+00	3.04E+00	3.00E+00	2.34E+00	1.82E+00	1.78E+01	1.39E+01	1.08E+01
Silver **	1.84E-02	8.24E-03	3.68E-03	1.16E-02	5.19E-03	2.32E-03	8.93E-04	3.99E-04	1.79E-04	5.43E-03	2.43E-03	1.09E-03	7.39E-03	3.30E-03	1.48E-03	1.42E-03	6.36E-04	2.84E-04
Zinc	1.04E-01	4.65E-02	2.08E-02	6.27E-01	2.81E-01	1.25E-01	1.01E-01	4.54E-02	2.03E-02	6.22E-01	2.78E-01	1.24E-01	1.09E-01	4.87E-02	2.18E-02	4.26E-01	1.91E-01	8.52E-02

** - Concentrations based on detection limits; chemical not detected

Shaded cells indicate HQ > 1

TABLE L-36
Hazard Quotients for Aquatic Food Web Exposures - Step 3A (Baseline) - 95% UCL - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Green Heron			Spotted Sandpiper			White-cheeked Pintail			Cave Swallow			Fishing Bat			Velvet Free-Tailed Bat		
	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																		
Arsenic	1.21E-02	7.67E-03	4.85E-03	4.87E-02	3.08E-02	1.95E-02	6.02E-03	3.81E-03	2.41E-03	4.65E-02	2.94E-02	1.86E-02	1.19E-01	5.34E-02	2.39E-02	6.76E-01	3.02E-01	1.35E-01
Chromium	1.13E-01	5.06E-02	2.26E-02	7.55E-01	3.37E-01	1.51E-01	8.33E-02	3.73E-02	1.67E-02	5.06E-01	2.26E-01	1.01E-01	4.72E-02	2.11E-02	9.43E-03	4.00E-01	1.79E-01	8.00E-02
Copper	1.63E-01	9.43E-02	5.45E-02	7.29E-01	4.22E-01	2.44E-01	1.52E-01	8.79E-02	5.09E-02	8.44E-01	4.88E-01	2.82E-01	3.03E-02	2.35E-02	1.82E-02	4.35E-01	3.37E-01	2.61E-01
Nickel	1.28E-01	5.73E-02	2.56E-02	9.01E-02	4.03E-02	1.80E-02	1.22E-02	5.48E-03	2.45E-03	6.03E-02	2.70E-02	1.21E-02	5.28E-01	3.74E-01	2.64E-01	1.70E-01	1.20E-01	8.49E-02
Selenium	3.30E-01	1.47E-01	6.60E-02	4.90E+00	3.47E+00	2.45E+00	4.10E-01	2.90E-01	2.05E-01	6.29E+00	3.41E+00	1.84E+00	1.02E+00	7.95E-01	6.19E-01	9.86E+00	7.68E+00	5.98E+00

Shaded cells indicate HQ > 1

TABLE L-37
Hazard Quotients for Aquatic Food Web Exposures - Step 3A (Baseline) - Mean - ECA Lagoon
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Green Heron			Spotted Sandpiper			White-cheeked Pintail			Cave Swallow			Fishing Bat			Velvet Free-Tailed Bat		
	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ	NOAEL HQ	MATC HQ	LOAEL HQ
Metals																		
Arsenic	1.08E-02	6.85E-03	4.33E-03	4.36E-02	2.76E-02	1.74E-02	5.49E-03	3.48E-03	2.20E-03	4.21E-02	2.66E-02	1.68E-02	1.05E-01	4.68E-02	2.09E-02	6.12E-01	2.74E-01	1.22E-01
Chromium	1.07E-01	4.80E-02	2.15E-02	7.07E-01	3.16E-01	1.41E-01	7.66E-02	3.43E-02	1.53E-02	4.89E-01	2.19E-01	9.79E-02	4.30E-02	1.92E-02	8.60E-03	3.87E-01	1.73E-01	7.73E-02
Copper	1.43E-01	8.30E-02	4.80E-02	6.42E-01	3.71E-01	2.15E-01	1.42E-01	8.23E-02	4.76E-02	7.43E-01	4.30E-01	2.49E-01	2.67E-02	2.07E-02	1.60E-02	3.83E-01	2.97E-01	2.30E-01
Nickel	1.16E-01	5.19E-02	2.32E-02	8.26E-02	3.69E-02	1.65E-02	1.13E-02	5.04E-03	2.26E-03	5.63E-02	2.52E-02	1.13E-02	4.78E-01	3.38E-01	2.39E-01	1.58E-01	1.12E-01	7.92E-02
Selenium	2.83E-01	1.27E-01	5.66E-02	4.21E+00	2.98E+00	2.11E+00	3.49E-01	2.47E-01	1.74E-01	5.40E+00	2.93E+00	1.58E+00	8.77E-01	6.83E-01	5.32E-01	8.47E+00	6.60E+00	5.13E+00

Shaded cells indicate HQ > 1

TABLE L-38
Recalculated Upper Trophic Level Aquatic Receptor Exposure Doses and Hazard Quotients for Selenium - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Receptor	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish 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
Green Heron															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	2.32E-01	1.80	4.02	9.00	1.29E-01	5.77E-02	2.58E-02
Spotted Sandpiper															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	4.13E-01	0.40	0.57	0.80	1.03E+00	7.30E-01	5.16E-01
White-cheeked Pintail															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	9.51E-02	0.40	0.57	0.80	2.38E-01	1.68E-01	1.19E-01
Cave Swallow															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	5.11E-01	0.44	0.81	1.50	1.16E+00	6.29E-01	3.41E-01
Fishing Bat															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	1.75E-01	0.20	0.26	0.33	8.77E-01	6.83E-01	5.32E-01
Velvet Free-tailed Bat															
Selenium	1.79	Regression[1]	2.14E+00	Regression	9.65E-01	1.00	1.79E+00	0	3.64E-01	0.20	0.26	0.33	1.82E+00	1.42E+00	1.10E+00

1 - Insect Se Concentration (mg/kg dw) = $10^{(0.239+(0.359*\log(\text{Se Sediment Concentration, mg/kg})))}$
Shaded cells indicate HQ > 1

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

			Green Heron	Spotted Sandpiper	White-Cheeked Pintail	Cave Swallow	Fishing Bat	Velvet Free-Tailed Bat
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	--	--	--	--	--	--
FIR =	Receptor-specific	= Food ingestion rate (kg/day dry weight)	0.0230	0.0080	0.0462	0.0038	0.0053	0.0017
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	--	--	--	--	--	--
PDFi =	Receptor-specific	= Proportion of diet composed of food item (aquatic invertebrates)	0.290	0.820	0.064	1.000	0.000	1.000
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)	--	--	--	--	--	--
PDFi =	Receptor-specific	= Proportion of diet composed of food item (aquatic plants)	0.000	0.000	0.903	0.000	0.000	0.000
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)	--	--	--	--	--	--
PDFi =	Receptor-specific	= Proportion of diet composed of food item (fish)	0.710	0.000	0.000	0.000	1.000	0.000
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)	--	--	--	--	--	--
PDS =	Receptor-specific	= Proportion of diet composed of sediment	0.000	0.180	0.033	0.000	0.000	0.000
BW =	Receptor-specific	= Body weight (kg)	0.187	0.0404	0.519	0.0158	0.0544	0.0101

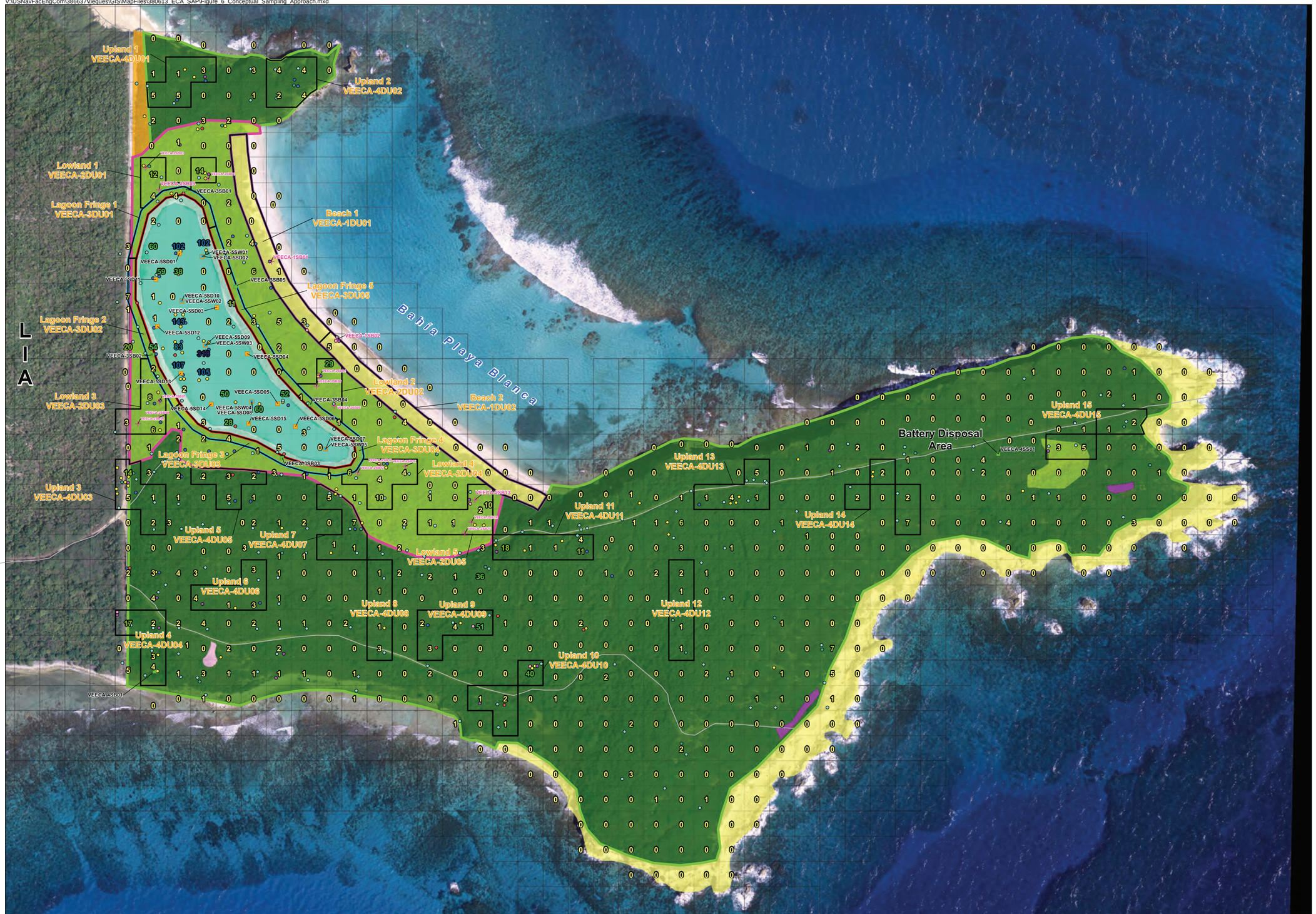
TABLE L-39
Reporting Limit to Screening Value Comparison
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Units	Frequency of Detection	Minimum Reporting Limit	Maximum Reporting Limit	Mean Concentration	Screening Value	Minimum Ratio	Maximum Ratio	Mean Ratio
Surface Soil - SMI									
Thallium	MG/KG	0 / 27	0.50	1.00	0.38	1.00	0.50	1.00	0.38
Deeper Surface Soil - Beach									
Selenium	MG/KG	0 / 2	5.10	5.20	2.58	0.52	9.81	10.0	4.95
Deeper Surface Soil - Upland									
Selenium	MG/KG	0 / 1	0.65	0.65	0.65	0.52	1.25	1.25	1.25
Surface Water - Lagoon									
Aluminum (dissolved)	UG/L	0 / 5	1,000	1,000	500	87.0	11.5	11.5	5.75
Cadmium (total)	UG/L	0 / 5	0.50	10.0	4.05	8.85	0.06	1.13	0.46
Cadmium (dissolved)	UG/L	0 / 5	10.0	10.0	5.00	8.80	1.14	1.14	0.57
Zinc (total)	UG/L	0 / 5	100	100	50.0	85.6	1.17	1.17	0.58
Zinc (dissolved)	UG/L	0 / 5	100	100	50.0	81.0	1.23	1.23	0.62
Sediment - Lagoon									
Nitrobenzene	UG/KG	0 / 15	29.0	30.0	14.9	21.0	1.38	1.43	0.71
Antimony	MG/KG	0 / 15	2.60	4.00	1.47	2.00	1.30	2.00	0.74

Shaded cells indicate ratio > 1

Figures

V:\USNavFacEngCom\386637Vieques\GIS\MapFiles\380613_ECA_SAP\Figure_6_Conceptual_Sampling_Approach.mxd



Legend

- Subsurface Soil Sample
- Surface Water Sample
- Sediment Sample
- Surface Soil Sample
- Sampling Units

Decision Unit Boundary

- Beach
- Upland
- Lowland
- Lagoon
- Lagoon Fringe

- Bombs
- Flares-Pyrotechnics
- MEC Component
- Projectiles / Mortars
- Rockets / Guided Missiles
- Submunitions
- Munitions Scrap

Land Cover

- Bare Ground
- Beach
- Evergreen Scrub
- Forest Scrub
- Mangrove
- Open Water
- Salt/Sand Flat
- Sparse Thorn Scrub

Quantity of Item Findings (MEC and Munitions Scrap)

- 0 - 5
- 5 - 10
- 10 - 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- 100 - 200
- 200 - 300
- > 300

N
W E
S

0 60 120 240
Feet

FIGURE L-1
ECA Sample Location Map
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL

E:\380613\1615\7TPA

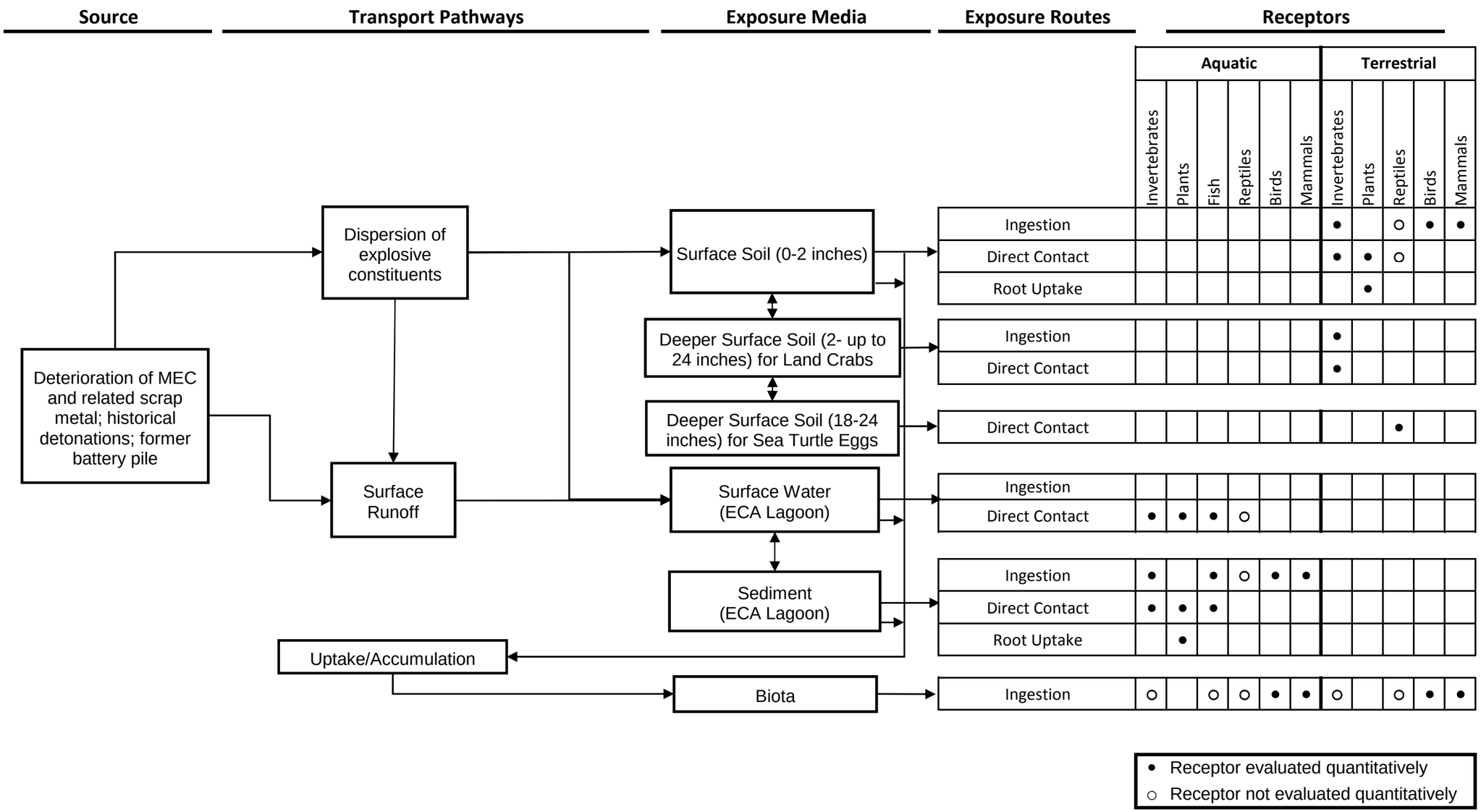


Figure L-2

Ecological Conceptual Site Model

Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Attachment L-1
Terrestrial Food Web Calculations

ATTACHMENT TABLE L-1-1
Summary of Norway Rat Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	7.39E-02	0.059	0.187	0.590	1.25E+00	3.96E-01	1.25E-01
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	3.49E-01	0.77	2.43	7.70	4.54E-01	1.43E-01	4.54E-02
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	1.44E+00	2.40	5.37	12.0	5.99E-01	2.68E-01	1.20E-01
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	1.70E+00	4.70	6.47	8.90	3.62E-01	2.63E-01	1.91E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	1.55E+00	0.20	0.26	0.33	7.74E+00	6.03E+00	4.69E+00
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	4.99E-01	4.16	5.88	8.31	1.20E-01	8.49E-02	6.01E-02
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	2.73E+01	75.4	169	377	3.62E-01	1.62E-01	7.23E-02
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	2.84E-03	2.64	5.96	13.4	1.08E-03	4.77E-04	2.12E-04
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	2.57E-02	34.7	74.5	160	7.39E-04	3.44E-04	1.60E-04
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	1.39E-02	30.0	47.4	75.0	4.64E-04	2.93E-04	1.86E-04
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	2.32E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	2.97E-02	6.40	14.3	32.0	4.64E-03	2.08E-03	9.29E-04

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0398	= 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 =	0.980	= 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
BW =	0.168	= Body weight (kg)

ATTACHMENT TABLE L-1-2
Summary of Indian Mongoose Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum 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)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	See footnote	3.12E-01	1.47E+00	0.059	0.187	0.590	2.50E+01	7.90E+00	2.50E+00
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	0.462	2.13E-01	2.68E+00	0.77	2.43	7.70	3.49E+00	1.10E+00	3.49E-01
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	0.349	2.07E+01	2.72E+01	2.40	5.37	12.0	1.13E+01	5.06E+00	2.26E+00
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	0.286	4.29E+00	3.33E+00	4.70	6.47	8.90	7.09E-01	5.15E-01	3.75E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	1.263	2.78E+00	4.32E-01	0.20	0.26	0.33	2.16E+00	1.68E+00	1.31E+00
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	0.013	9.36E-01	1.20E+00	4.16	5.88	8.31	2.87E-01	2.03E-01	1.44E-01
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	2.782	1.78E+02	1.18E+02	75.4	169	377	1.57E+00	7.00E-01	3.13E-01
Explosives														
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	0.000	0.00E+00	1.77E-03	2.64	5.96	13.4	6.70E-04	2.97E-04	1.32E-04
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	0.000	0.00E+00	3.83E-03	34.7	74.5	160	1.10E-04	5.14E-05	2.40E-05
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	0.000	0.00E+00	3.98E-03	30.0	47.4	75.0	1.33E-04	8.39E-05	5.31E-05
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	0.000	0.00E+00	1.44E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	0.000	0.00E+00	2.36E-04	6.40	14.3	32.0	3.69E-05	1.65E-05	7.37E-06

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0460	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.972	= 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 =	0.000	= 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
BW =	0.312	= Body weight (kg)

ATTACHMENT TABLE L-1-3
Summary of Fruit Bat Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	1.94E-02	0.059	0.187	0.590	3.28E-01	1.04E-01	3.28E-02
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	2.54E-01	0.77	2.43	7.70	3.30E-01	1.04E-01	3.30E-02
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	8.46E-01	2.40	5.37	12.0	3.53E-01	1.58E-01	7.05E-02
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	1.19E+00	4.70	6.47	8.90	2.54E-01	1.84E-01	1.34E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	1.12E+00	0.20	0.26	0.33	5.62E+00	4.38E+00	3.41E+00
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	1.18E-01	4.16	5.88	8.31	2.83E-02	2.00E-02	1.41E-02
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	1.97E+01	75.4	169	377	2.61E-01	1.17E-01	5.23E-02
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	2.04E-03	2.64	5.96	13.4	7.72E-04	3.42E-04	1.52E-04
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	1.87E-02	34.7	74.5	160	5.38E-04	2.51E-04	1.17E-04
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	1.01E-02	30.0	47.4	75.0	3.36E-04	2.13E-04	1.34E-04
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	1.66E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	2.17E-02	6.40	14.3	32.0	3.40E-03	1.52E-03	6.79E-04

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0058 = 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 = 1.000 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
BW = 0.0341 = Body weight (kg)

ATTACHMENT TABLE L-1-4
Summary of Velvet Free-Tailed Bat Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	2.38E+00	0.059	0.187	0.590	4.03E+01	1.27E+01	4.03E+00
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	4.45E+00	0.77	2.43	7.70	5.78E+00	1.83E+00	5.78E-01
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	4.46E+01	2.40	5.37	12.0	1.86E+01	8.32E+00	3.72E+00
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	5.43E+00	4.70	6.47	8.90	1.15E+00	8.39E-01	6.10E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	7.01E-01	0.20	0.26	0.33	3.50E+00	2.73E+00	2.12E+00
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	1.49E+00	4.16	5.88	8.31	3.59E-01	2.54E-01	1.80E-01
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	1.95E+02	75.4	169	377	2.59E+00	1.16E+00	5.18E-01
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	2.85E-03	2.64	5.96	13.4	1.08E-03	4.79E-04	2.12E-04
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	6.18E-03	34.7	74.5	160	1.78E-04	8.29E-05	3.86E-05
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	6.42E-03	30.0	47.4	75.0	2.14E-04	1.35E-04	8.56E-05
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	2.33E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	3.80E-04	6.40	14.3	32.0	5.94E-05	2.66E-05	1.19E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0019	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	1.000	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0080	= Body weight (kg)

ATTACHMENT TABLE L-1-5
Summary of Pearly-eyed Thrasher Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	2.18E+00	NA	NA	NA	NA	NA	NA
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	3.89E+00	1.47	3.29	7.35	2.65E+00	1.18E+00	5.30E-01
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	3.96E+01	2.66	5.95	13.3	1.49E+01	6.66E+00	2.98E+00
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	4.89E+00	3.85	8.61	19.3	1.27E+00	5.68E-01	2.54E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	6.34E-01	0.44	0.81	1.50	1.44E+00	7.81E-01	4.23E-01
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	2.02E+00	0.344	0.486	0.688	5.87E+00	4.15E+00	2.94E+00
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	1.71E+02	66.1	148	331	2.59E+00	1.16E+00	5.19E-01
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	2.61E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	5.66E-03	2.00	3.74	7.00	2.83E-03	1.51E-03	8.09E-04
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	5.88E-03	7.90	25.0	79.0	7.44E-04	2.35E-04	7.44E-05
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	2.13E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	3.48E-04	13.0	18.4	26.0	2.68E-05	1.89E-05	1.34E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0174	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.954	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
BW =	0.080	= Body weight (kg)

ATTACHMENT TABLE L-1-6
Summary of Red-tailed Hawk Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum 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)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	See footnote	3.12E-01	1.29E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	0.462	2.13E-01	8.78E-03	1.47	3.29	7.35	5.97E-03	2.67E-03	1.19E-03
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	0.349	2.07E+01	8.56E-01	2.66	5.95	13.3	3.22E-01	1.44E-01	6.44E-02
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	0.286	4.29E+00	1.77E-01	3.85	8.61	19.3	4.60E-02	2.06E-02	9.20E-03
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	1.263	2.78E+00	1.15E-01	0.44	0.81	1.50	2.61E-01	1.41E-01	7.65E-02
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	0.013	9.36E-01	3.87E-02	0.344	0.486	0.688	1.12E-01	7.95E-02	5.62E-02
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	2.782	1.78E+02	7.33E+00	66.1	148	331	1.11E-01	4.96E-02	2.22E-02
Explosives														
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	0.000	0.00E+00	0.00E+00	2.00	3.74	7.00	0.00E+00	0.00E+00	0.00E+00
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	0.000	0.00E+00	0.00E+00	7.90	25.0	79.0	0.00E+00	0.00E+00	0.00E+00
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	0.000	0.00E+00	0.00E+00	13.0	18.4	26.0	0.00E+00	0.00E+00	0.00E+00

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI = Chemical-specific
FIR = 0.0395
FCxi = Chemical-specific
PDFi = 0.000
FCxi = Chemical-specific
PDFi = 0.000
FCxi = Chemical-specific
PDFi = 1.000
SCx = Chemical-specific
PDS = 0.000
BW = 0.957

ATTACHMENT TABLE L-1-7
Summary of Common Ground Dove Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	2.21E-01	NA	NA	NA	NA	NA	NA
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	5.25E-01	1.47	3.29	7.35	3.57E-01	1.60E-01	7.14E-02
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	2.80E+00	2.66	5.95	13.3	1.05E+00	4.71E-01	2.11E-01
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	2.70E+00	1.63	2.31	3.26	1.66E+00	1.17E+00	8.28E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	2.33E+00	0.29	0.41	0.58	8.03E+00	5.69E+00	4.02E+00
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	1.54E+00	0.344	0.486	0.688	4.47E+00	3.16E+00	2.24E+00
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	4.13E+01	66.1	148	331	6.25E-01	2.79E-01	1.25E-01
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	4.36E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	3.85E-02	2.00	3.74	7.00	1.92E-02	1.03E-02	5.50E-03
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	2.10E-02	7.90	25.0	79.0	2.66E-03	8.41E-04	2.66E-04
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	3.56E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	4.43E-02	13.0	18.4	26.0	3.40E-03	2.41E-03	1.70E-03

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0081	= 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
BW =	0.0224	= Body weight (kg)

ATTACHMENT TABLE L-1-8
Summary of Cave Swallow Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	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	10.0	1.000	1.00E+01	0.011	1.14E-01	3.04E+00	NA	NA	NA	NA	NA	NA
Cadmium	0.46	40.69	1.87E+01	3.250	1.50E+00	5.70E+00	1.47	3.29	7.35	3.88E+00	1.73E+00	7.75E-01
Chromium	59.4	3.162	1.88E+02	0.084	4.98E+00	5.72E+01	2.66	5.95	13.3	2.15E+01	9.61E+00	4.30E+00
Lead	15.0	1.522	2.28E+01	0.468	7.02E+00	6.95E+00	3.85	8.61	19.3	1.81E+00	8.07E-01	3.61E-01
Selenium	2.20	1.340	2.95E+00	3.012	6.63E+00	8.97E-01	0.44	0.81	1.50	2.04E+00	1.10E+00	5.98E-01
Vanadium	71.4	0.088	6.28E+00	0.010	6.93E-01	1.91E+00	0.344	0.486	0.688	5.56E+00	3.93E+00	2.78E+00
Zinc	63.8	12.89	8.22E+02	1.820	1.16E+02	2.50E+02	66.1	148	331	3.79E+00	1.69E+00	7.57E-01
Explosives												
1,3,5-Trinitrobenzene	0.01200	1.000	1.20E-02	1.000	1.20E-02	3.65E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.02600	1.000	2.60E-02	4.230	1.10E-01	7.92E-03	2.00	3.74	7.00	3.96E-03	2.12E-03	1.13E-03
HMX	0.02700	1.000	2.70E-02	2.200	5.94E-02	8.22E-03	7.90	25.0	79.0	1.04E-03	3.29E-04	1.04E-04
Nitrobenzene	0.09800	1.000	9.80E-02	1.000	9.80E-02	2.98E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00160	1.000	1.60E-03	80.00	1.28E-01	4.87E-04	13.0	18.4	26.0	3.75E-05	2.65E-05	1.87E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0044	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	1.000	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0144	= Body weight (kg)

ATTACHMENT TABLE L-1-9
Summary of Norway Rat Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	2.62E-01	0.059	0.187	0.590	4.44E+00	1.40E+00	4.44E-01
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	1.51E-01	0.77	2.43	7.70	1.96E-01	6.20E-02	1.96E-02
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	6.88E-01	2.40	5.37	12.0	2.87E-01	1.28E-01	5.73E-02
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	1.57E-01	4.70	6.47	8.90	3.34E-02	2.43E-02	1.76E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	8.74E-02	0.20	0.26	0.33	4.37E-01	3.40E-01	2.65E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	1.98E-01	4.16	5.88	8.31	4.76E-02	3.37E-02	2.38E-02
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	1.47E+01	75.4	169	377	1.94E-01	8.69E-02	3.89E-02
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	1.48E-03	2.64	5.96	13.4	5.60E-04	2.48E-04	1.10E-04
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	4.07E-03	34.7	74.5	160	1.17E-04	5.46E-05	2.54E-05
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	8.88E-04	30.0	47.4	75.0	2.96E-05	1.87E-05	1.18E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	5.64E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	1.35E-03	6.40	14.3	32.0	2.11E-04	9.42E-05	4.21E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW = 0.209 = Body weight (kg)

ATTACHMENT TABLE L-1-10
Summary of Indian Mongoose Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	See footnote	2.64E+00	2.03E-01	0.059	0.187	0.590	3.45E+00	1.09E+00	3.45E-01
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	Regresson	9.92E-02	8.90E-02	0.77	2.43	7.70	1.16E-01	3.66E-02	1.16E-02
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	Regresson	3.05E+00	4.54E-01	2.40	5.37	12.0	1.89E-01	8.46E-02	3.78E-02
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	Regresson	2.00E+00	1.17E-01	4.70	6.47	8.90	2.50E-02	1.82E-02	1.32E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	Regresson	7.18E-01	5.07E-02	0.20	0.26	0.33	2.53E-01	1.97E-01	1.54E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	0.010	4.99E-01	1.39E-01	4.16	5.88	8.31	3.35E-02	2.37E-02	1.68E-02
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	Regresson	1.13E+02	1.02E+01	75.4	169	377	1.35E-01	6.05E-02	2.70E-02
Explosives														
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	0.000	0.00E+00	5.66E-04	2.64	5.96	13.4	2.14E-04	9.50E-05	4.21E-05
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	0.000	0.00E+00	9.11E-04	34.7	74.5	160	2.62E-05	1.22E-05	5.69E-06
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	0.000	0.00E+00	3.42E-04	30.0	47.4	75.0	1.14E-05	7.20E-06	4.55E-06
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	0.000	0.00E+00	2.16E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	0.000	0.00E+00	1.83E-04	6.40	14.3	32.0	2.86E-05	1.28E-05	5.73E-06

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW =	0.528	= Body weight (kg)

ATTACHMENT TABLE L-1-11
Summary of Fruit Bat Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	1.92E-02	0.059	0.187	0.590	3.26E-01	1.03E-01	3.26E-02
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	3.18E-02	0.77	2.43	7.70	4.13E-02	1.30E-02	4.13E-03
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	1.55E-01	2.40	5.37	12.0	6.48E-02	2.90E-02	1.30E-02
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	6.25E-02	4.70	6.47	8.90	1.33E-02	9.67E-03	7.03E-03
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	7.01E-02	0.20	0.26	0.33	3.51E-01	2.73E-01	2.13E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	2.49E-02	4.16	5.88	8.31	5.97E-03	4.23E-03	2.99E-03
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	3.57E+00	75.4	169	377	4.73E-02	2.12E-02	9.47E-03
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	1.60E-03	2.64	5.96	13.4	6.08E-04	2.69E-04	1.19E-04
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	7.24E-03	34.7	74.5	160	2.09E-04	9.71E-05	4.52E-05
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	9.66E-04	30.0	47.4	75.0	3.22E-05	2.04E-05	1.29E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	6.12E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	2.91E-03	6.40	14.3	32.0	4.55E-04	2.04E-04	9.10E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0044 = 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 = 1.000 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
BW = 0.0408 = Body weight (kg)

ATTACHMENT TABLE L-1-12
Summary of Velvet Free-Tailed Bat Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	8.53E-01	0.059	0.187	0.590	1.45E+01	4.57E+00	1.45E+00
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	4.77E-01	0.77	2.43	7.70	6.20E-01	1.96E-01	6.20E-02
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	1.92E+00	2.40	5.37	12.0	8.00E-01	3.58E-01	1.60E-01
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	4.24E-01	4.70	6.47	8.90	9.01E-02	6.55E-02	4.76E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	1.87E-01	0.20	0.26	0.33	9.33E-01	7.27E-01	5.66E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	3.20E-01	4.16	5.88	8.31	7.69E-02	5.44E-02	3.85E-02
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	4.55E+01	75.4	169	377	6.04E-01	2.70E-01	1.21E-01
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	2.54E-03	2.64	5.96	13.4	9.62E-04	4.26E-04	1.89E-04
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	2.71E-03	34.7	74.5	160	7.80E-05	3.63E-05	1.69E-05
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	1.47E-03	30.0	47.4	75.0	4.92E-05	3.11E-05	1.97E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	9.69E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	1.12E-04	6.40	14.3	32.0	1.76E-05	7.86E-06	3.51E-06

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0017	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	1.000	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0101	= Body weight (kg)

ATTACHMENT TABLE L-1-13
Summary of Pearly-eyed Thrasher Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	4.78E-01	NA	NA	NA	NA	NA	NA
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	2.58E-01	1.47	3.29	7.35	1.76E-01	7.86E-02	3.51E-02
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	1.23E+00	2.66	5.95	13.3	4.63E-01	2.07E-01	9.27E-02
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	2.58E-01	3.85	8.61	19.3	6.69E-02	2.99E-02	1.34E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	1.20E-01	0.44	0.81	1.50	2.73E-01	1.48E-01	8.00E-02
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	4.35E-01	0.344	0.486	0.688	1.27E+00	8.95E-01	6.33E-01
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	2.48E+01	66.1	148	331	3.75E-01	1.68E-01	7.51E-02
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	1.76E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	3.10E-03	2.00	3.74	7.00	1.55E-03	8.28E-04	4.42E-04
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	1.07E-03	7.90	25.0	79.0	1.36E-04	4.29E-05	1.36E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	6.73E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	7.03E-04	13.0	18.4	26.0	5.41E-05	3.82E-05	2.70E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW = 0.104 = Body weight (kg)

ATTACHMENT TABLE L-1-14
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	See footnote	2.64E+00	8.44E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	Regresson	9.92E-02	3.17E-03	1.47	3.29	7.35	2.16E-03	9.65E-04	4.32E-04
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	Regresson	3.05E+00	9.75E-02	2.66	5.95	13.3	3.66E-02	1.64E-02	7.33E-03
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	Regresson	2.00E+00	6.41E-02	3.85	8.61	19.3	1.66E-02	7.44E-03	3.33E-03
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	Regresson	7.18E-01	2.30E-02	0.44	0.81	1.50	5.22E-02	2.83E-02	1.53E-02
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	0.010	4.99E-01	1.60E-02	0.344	0.486	0.688	4.64E-02	3.28E-02	2.32E-02
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	Regresson	1.13E+02	3.62E+00	66.1	148	331	5.47E-02	2.45E-02	1.09E-02
Explosives														
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	0.000	0.00E+00	0.00E+00	2.00	3.74	7.00	0.00E+00	0.00E+00	0.00E+00
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	0.000	0.00E+00	0.00E+00	7.90	25.0	79.0	0.00E+00	0.00E+00	0.00E+00
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	0.000	0.00E+00	0.00E+00	13.0	18.4	26.0	0.00E+00	0.00E+00	0.00E+00

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW = 1.134 = Body weight (kg)

ATTACHMENT TABLE L-1-15
Summary of Common Ground Dove Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	8.98E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	6.27E-02	1.47	3.29	7.35	4.27E-02	1.91E-02	8.53E-03
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	6.70E-01	2.66	5.95	13.3	2.52E-01	1.13E-01	5.04E-02
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	1.61E-01	1.63	2.31	3.26	9.90E-02	7.00E-02	4.95E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	1.46E-01	0.29	0.41	0.58	5.03E-01	3.56E-01	2.52E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	5.62E-01	0.344	0.486	0.688	1.63E+00	1.16E+00	8.17E-01
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	7.08E+00	66.1	148	331	1.07E-01	4.79E-02	2.14E-02
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	3.19E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	1.38E-02	2.00	3.74	7.00	6.92E-03	3.70E-03	1.98E-03
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	2.00E-03	7.90	25.0	79.0	2.53E-04	7.99E-05	2.53E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	1.22E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	5.51E-03	13.0	18.4	26.0	4.24E-04	2.99E-04	2.12E-04

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW =	0.0320	= Body weight (kg)

ATTACHMENT TABLE L-1-16
Summary of Cave Swallow Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	1.20E+00	NA	NA	NA	NA	NA	NA
Cadmium	0.26	Regression	2.80E+00	Regresson	2.95E-01	6.69E-01	1.47	3.29	7.35	4.55E-01	2.04E-01	9.10E-02
Chromium	35.2	0.320	1.13E+01	0.041	1.44E+00	2.69E+00	2.66	5.95	13.3	1.01E+00	4.53E-01	2.03E-01
Lead	4.04	Regression	2.48E+00	Regresson	5.80E-01	5.94E-01	3.85	8.61	19.3	1.54E-01	6.90E-02	3.09E-02
Selenium	1.25	Regression	1.09E+00	Regresson	6.51E-01	2.62E-01	0.44	0.81	1.50	5.95E-01	3.22E-01	1.75E-01
Vanadium	48.1	0.039	1.88E+00	0.005	2.31E-01	4.49E-01	0.344	0.486	0.688	1.30E+00	9.22E-01	6.52E-01
Zinc	32.1	Regression	2.67E+02	Regresson	3.31E+01	6.38E+01	66.1	148	331	9.66E-01	4.32E-01	1.93E-01
Explosives												
1,3,5-Trinitrobenzene	0.01489	1.000	1.49E-02	1.000	1.49E-02	3.56E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01588	1.000	1.59E-02	4.230	6.72E-02	3.80E-03	2.00	3.74	7.00	1.90E-03	1.02E-03	5.43E-04
HMX	0.01601	0.540	8.65E-03	0.560	8.97E-03	2.07E-03	7.90	25.0	79.0	2.62E-04	8.28E-05	2.62E-05
Nitrobenzene	0.05681	1.000	5.68E-02	1.000	5.68E-02	1.36E-02	NA	NA	NA	NA	NA	NA
Perchlorate	0.00066	1.000	6.59E-04	41.00	2.70E-02	1.58E-04	13.0	18.4	26.0	1.21E-05	8.58E-06	6.07E-06

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0038 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 1.000 = 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)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
BW = 0.0158 = Body weight (kg)

ATTACHMENT TABLE L-1-17
Summary of Norway Rat Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	2.62E-01	0.059	0.187	0.590	4.44E+00	1.40E+00	4.44E-01
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	1.42E-01	0.77	2.43	7.70	1.84E-01	5.82E-02	1.84E-02
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	5.95E-01	2.40	5.37	12.0	2.48E-01	1.11E-01	4.95E-02
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	1.25E-01	4.70	6.47	8.90	2.65E-02	1.93E-02	1.40E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	7.87E-02	0.20	0.26	0.33	3.93E-01	3.06E-01	2.38E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	1.69E-01	4.16	5.88	8.31	4.06E-02	2.87E-02	2.03E-02
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	1.38E+01	75.4	169	377	1.83E-01	8.20E-02	3.67E-02
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	1.45E-03	2.64	5.96	13.4	5.50E-04	2.44E-04	1.08E-04
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	3.88E-03	34.7	74.5	160	1.12E-04	5.21E-05	2.43E-05
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	8.45E-04	30.0	47.4	75.0	2.82E-05	1.78E-05	1.13E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	2.88E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	1.05E-03	6.40	14.3	32.0	1.64E-04	7.34E-05	3.28E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW =	0.209	= Body weight (kg)

ATTACHMENT TABLE L-1-18
Summary of Indian Mongoose Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	See footnote	2.64E+00	2.03E-01	0.059	0.187	0.590	3.45E+00	1.09E+00	3.45E-01
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	Regresson	9.47E-02	8.34E-02	0.77	2.43	7.70	1.08E-01	3.43E-02	1.08E-02
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	Regresson	2.74E+00	3.94E-01	2.40	5.37	12.0	1.64E-01	7.35E-02	3.28E-02
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	Regresson	1.75E+00	9.50E-02	4.70	6.47	8.90	2.02E-02	1.47E-02	1.07E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	Regresson	6.87E-01	4.67E-02	0.20	0.26	0.33	2.33E-01	1.82E-01	1.41E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	0.010	4.26E-01	1.19E-01	4.16	5.88	8.31	2.86E-02	2.02E-02	1.43E-02
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	Regresson	1.12E+02	9.72E+00	75.4	169	377	1.29E-01	5.76E-02	2.58E-02
Explosives														
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	0.000	0.00E+00	5.56E-04	2.64	5.96	13.4	2.11E-04	9.34E-05	4.14E-05
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	0.000	0.00E+00	8.69E-04	34.7	74.5	160	2.50E-05	1.17E-05	5.43E-06
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	0.000	0.00E+00	3.25E-04	30.0	47.4	75.0	1.08E-05	6.85E-06	4.33E-06
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	0.000	0.00E+00	1.10E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	0.000	0.00E+00	1.43E-04	6.40	14.3	32.0	2.23E-05	9.98E-06	4.46E-06

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW =	0.528	= Body weight (kg)

ATTACHMENT TABLE L-1-19
Summary of Fruit Bat Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	1.92E-02	0.059	0.187	0.590	3.26E-01	1.03E-01	3.26E-02
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	3.04E-02	0.77	2.43	7.70	3.94E-02	1.25E-02	3.94E-03
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	1.34E-01	2.40	5.37	12.0	5.60E-02	2.50E-02	1.12E-02
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	5.28E-02	4.70	6.47	8.90	1.12E-02	8.17E-03	5.94E-03
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	6.14E-02	0.20	0.26	0.33	3.07E-01	2.39E-01	1.86E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	2.12E-02	4.16	5.88	8.31	5.10E-03	3.61E-03	2.55E-03
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	3.26E+00	75.4	169	377	4.32E-02	1.93E-02	8.64E-03
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	1.58E-03	2.64	5.96	13.4	5.97E-04	2.65E-04	1.17E-04
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	6.90E-03	34.7	74.5	160	1.99E-04	9.27E-05	4.31E-05
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	9.18E-04	30.0	47.4	75.0	3.06E-05	1.94E-05	1.22E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	3.12E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	2.27E-03	6.40	14.3	32.0	3.55E-04	1.59E-04	7.09E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0044	= 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 =	1.000	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0408	= Body weight (kg)

ATTACHMENT TABLE L-1-20
Summary of Velvet Free-Tailed Bat Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	8.53E-01	0.059	0.187	0.590	1.45E+01	4.57E+00	1.45E+00
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	4.47E-01	0.77	2.43	7.70	5.80E-01	1.84E-01	5.80E-02
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	1.66E+00	2.40	5.37	12.0	6.92E-01	3.09E-01	1.38E-01
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	3.32E-01	4.70	6.47	8.90	7.07E-02	5.14E-02	3.73E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	1.71E-01	0.20	0.26	0.33	8.55E-01	6.65E-01	5.18E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	2.73E-01	4.16	5.88	8.31	6.56E-02	4.64E-02	3.29E-02
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	4.31E+01	75.4	169	377	5.72E-01	2.56E-01	1.14E-01
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	2.50E-03	2.64	5.96	13.4	9.46E-04	4.19E-04	1.86E-04
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	2.58E-03	34.7	74.5	160	7.45E-05	3.47E-05	1.61E-05
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	1.40E-03	30.0	47.4	75.0	4.67E-05	2.96E-05	1.87E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	4.95E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	8.76E-05	6.40	14.3	32.0	1.37E-05	6.12E-06	2.74E-06

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0017	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	1.000	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0101	= Body weight (kg)

ATTACHMENT TABLE L-1-21
Summary of Pearly-eyed Thrasher Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	4.78E-01	NA	NA	NA	NA	NA	NA
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	2.42E-01	1.47	3.29	7.35	1.65E-01	7.37E-02	3.29E-02
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	1.07E+00	2.66	5.95	13.3	4.00E-01	1.79E-01	8.01E-02
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	2.02E-01	3.85	8.61	19.3	5.25E-02	2.35E-02	1.05E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	1.09E-01	0.44	0.81	1.50	2.48E-01	1.34E-01	7.27E-02
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	3.72E-01	0.344	0.486	0.688	1.08E+00	7.64E-01	5.40E-01
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	2.34E+01	66.1	148	331	3.55E-01	1.59E-01	7.10E-02
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	1.73E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	2.95E-03	2.00	3.74	7.00	1.48E-03	7.90E-04	4.22E-04
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	1.02E-03	7.90	25.0	79.0	1.29E-04	4.08E-05	1.29E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	3.44E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	5.48E-04	13.0	18.4	26.0	4.22E-05	2.98E-05	2.11E-05

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW = 0.104 = Body weight (kg)

ATTACHMENT TABLE L-1-22
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	See footnote	2.64E+00	8.44E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	Regresson	9.47E-02	3.03E-03	1.47	3.29	7.35	2.06E-03	9.21E-04	4.12E-04
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	Regresson	2.74E+00	8.76E-02	2.66	5.95	13.3	3.29E-02	1.47E-02	6.59E-03
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	Regresson	1.75E+00	5.61E-02	3.85	8.61	19.3	1.46E-02	6.51E-03	2.91E-03
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	Regresson	6.87E-01	2.20E-02	0.44	0.81	1.50	4.99E-02	2.70E-02	1.46E-02
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	0.010	4.26E-01	1.36E-02	0.344	0.486	0.688	3.96E-02	2.80E-02	1.98E-02
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	Regresson	1.12E+02	3.57E+00	66.1	148	331	5.40E-02	2.42E-02	1.08E-02
Explosives														
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	0.000	0.00E+00	0.00E+00	2.00	3.74	7.00	0.00E+00	0.00E+00	0.00E+00
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	0.000	0.00E+00	0.00E+00	7.90	25.0	79.0	0.00E+00	0.00E+00	0.00E+00
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	0.000	0.00E+00	0.00E+00	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	0.000	0.00E+00	0.00E+00	13.0	18.4	26.0	0.00E+00	0.00E+00	0.00E+00

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
Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW =	1.134	= Body weight (kg)

ATTACHMENT TABLE L-1-23
Summary of Common Ground Dove Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	8.98E-02	NA	NA	NA	NA	NA	NA
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	5.99E-02	1.47	3.29	7.35	4.07E-02	1.82E-02	8.14E-03
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	5.79E-01	2.66	5.95	13.3	2.18E-01	9.74E-02	4.36E-02
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	1.32E-01	1.63	2.31	3.26	8.09E-02	5.72E-02	4.04E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	1.28E-01	0.29	0.41	0.58	4.41E-01	3.12E-01	2.21E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	4.80E-01	0.344	0.486	0.688	1.39E+00	9.86E-01	6.97E-01
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	6.44E+00	66.1	148	331	9.74E-02	4.36E-02	1.95E-02
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	3.14E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	1.32E-02	2.00	3.74	7.00	6.60E-03	3.53E-03	1.89E-03
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	1.90E-03	7.90	25.0	79.0	2.40E-04	7.59E-05	2.40E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	6.21E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	4.29E-03	13.0	18.4	26.0	3.30E-04	2.33E-04	1.65E-04

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

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
BW = 0.0320 = Body weight (kg)

ATTACHMENT TABLE L-1-24
Summary of Cave Swallow Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, 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)	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	5.00	1.000	5.00E+00	Regresson	1.78E-01	1.20E+00	NA	NA	NA	NA	NA	NA
Cadmium	0.24	Regression	2.62E+00	Regresson	2.82E-01	6.27E-01	1.47	3.29	7.35	4.26E-01	1.91E-01	8.53E-02
Chromium	30.4	0.320	9.74E+00	0.041	1.25E+00	2.33E+00	2.66	5.95	13.3	8.76E-01	3.92E-01	1.75E-01
Lead	2.99	Regression	1.95E+00	Regresson	4.90E-01	4.66E-01	3.85	8.61	19.3	1.21E-01	5.41E-02	2.42E-02
Selenium	1.11	Regression	1.00E+00	Regresson	5.70E-01	2.40E-01	0.44	0.81	1.50	5.45E-01	2.95E-01	1.60E-01
Vanadium	41.1	0.039	1.60E+00	0.005	1.97E-01	3.83E-01	0.344	0.486	0.688	1.11E+00	7.87E-01	5.57E-01
Zinc	27.2	Regression	2.53E+02	Regresson	3.02E+01	6.05E+01	66.1	148	331	9.15E-01	4.09E-01	1.83E-01
Explosives												
1,3,5-Trinitrobenzene	0.01464	1.000	1.46E-02	1.000	1.46E-02	3.50E-03	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.01515	1.000	1.51E-02	4.230	6.41E-02	3.62E-03	2.00	3.74	7.00	1.81E-03	9.68E-04	5.18E-04
HMX	0.01522	0.540	8.22E-03	0.560	8.52E-03	1.97E-03	7.90	25.0	79.0	2.49E-04	7.87E-05	2.49E-05
Nitrobenzene	0.02900	1.000	2.90E-02	1.000	2.90E-02	6.94E-03	NA	NA	NA	NA	NA	NA
Perchlorate	0.00051	1.000	5.14E-04	41.00	2.11E-02	1.23E-04	13.0	18.4	26.0	9.46E-06	6.69E-06	4.73E-06

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0038	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	1.000	= 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)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
BW =	0.0158	= Body weight (kg)

Attachment L-2
Aquatic Food Web Calculations

ATTACHMENT TABLE L-2-1
Summary of Green Heron Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	7.73E-02	5.14	8.12	12.8	1.50E-02	9.52E-03	6.02E-03
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	6.55E-03	1.47	3.29	7.35	4.45E-03	1.99E-03	8.91E-04
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	2.51E-01	2.66	5.95	13.3	9.43E-02	4.22E-02	1.89E-02
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	4.82E-01	4.05	7.00	12.1	1.19E-01	6.88E-02	3.98E-02
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	8.22E-02	3.85	8.61	19.3	2.14E-02	9.55E-03	4.27E-03
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	2.01E+00	6.71	15.0	33.6	2.99E-01	1.34E-01	5.99E-02
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	5.02E-01	1.80	4.02	9.00	2.79E-01	1.25E-01	5.58E-02
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	7.44E-02	4.04	9.03	20.2	1.84E-02	8.24E-03	3.68E-03
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	6.87E+00	66.1	148	331	1.04E-01	4.65E-02	2.08E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0257	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	1.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.138	= Body weight (kg)				

ATTACHMENT TABLE L-2-2
Summary of Spotted Sandpiper Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	8.80E-01	5.14	8.12	12.8	1.71E-01	1.08E-01	6.86E-02
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	1.55E-01	1.47	3.29	7.35	1.05E-01	4.70E-02	2.10E-02
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	7.16E+00	2.66	5.95	13.3	2.69E+00	1.20E+00	5.38E-01
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	6.21E+01	4.05	7.00	12.1	1.53E+01	8.87E+00	5.13E+00
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	5.44E-01	3.85	8.61	19.3	1.41E-01	6.32E-02	2.83E-02
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	1.37E+00	6.71	15.0	33.6	2.05E-01	9.15E-02	4.09E-02
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	4.57E+00	0.40	0.57	0.80	1.14E+01	8.08E+00	5.71E+00
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	4.69E-02	4.04	9.03	20.2	1.16E-02	5.19E-03	2.32E-03
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	4.15E+01	66.1	148	331	6.27E-01	2.81E-01	1.25E-01

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0105	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.820	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.180	= Proportion of diet composed of sediment				
BW =	0.0294	= Body weight (kg)				

ATTACHMENT TABLE L-2-3
Summary of White-cheeked Pintail Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	4.78E-01	5.14	8.12	12.8	9.30E-02	5.88E-02	3.72E-02
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	6.69E-02	1.47	3.29	7.35	4.55E-02	2.04E-02	9.10E-03
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	5.34E-01	2.66	5.95	13.3	2.01E-01	8.97E-02	4.01E-02
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	2.17E+00	4.05	7.00	12.1	5.37E-01	3.11E-01	1.80E-01
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	2.17E-01	3.85	8.61	19.3	5.65E-02	2.53E-02	1.13E-02
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	1.99E+00	6.71	15.0	33.6	2.96E-01	1.32E-01	5.92E-02
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	1.05E+00	0.40	0.57	0.80	2.62E+00	1.85E+00	1.31E+00
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	3.61E-03	4.04	9.03	20.2	8.93E-04	3.99E-04	1.79E-04
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	6.71E+00	66.1	148	331	1.01E-01	4.54E-02	2.03E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0529	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.967	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.033	= Proportion of diet composed of sediment				
BW =	0.402	= Body weight (kg)				

ATTACHMENT TABLE L-2-4
Summary of Cave Swallow Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	6.93E-01	5.14	8.12	12.8	1.35E-01	8.53E-02	5.40E-02
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	1.50E-01	1.47	3.29	7.35	1.02E-01	4.55E-02	2.04E-02
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	5.06E+00	2.66	5.95	13.3	1.90E+00	8.50E-01	3.80E-01
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	6.27E+01	4.05	7.00	12.1	1.55E+01	8.96E+00	5.19E+00
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	3.37E-01	3.85	8.61	19.3	8.76E-02	3.92E-02	1.75E-02
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	7.04E-01	6.71	15.0	33.6	1.05E-01	4.69E-02	2.10E-02
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	4.56E+00	0.44	0.81	1.50	1.04E+01	5.62E+00	3.04E+00
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	2.19E-02	4.04	9.03	20.2	5.43E-03	2.43E-03	1.09E-03
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	4.11E+01	66.1	148	331	6.22E-01	2.78E-01	1.24E-01

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0044	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0144	= Body weight (kg)				

ATTACHMENT TABLE L-2-5
Summary of Fishing Bat Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	9.25E-02	0.252	0.563	1.260	3.67E-01	1.64E-01	7.34E-02
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	7.83E-03	0.77	2.43	7.70	1.02E-02	3.21E-03	1.02E-03
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	3.00E-01	2.40	5.37	12.0	1.25E-01	5.59E-02	2.50E-02
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	5.76E-01	5.60	7.23	9.34	1.03E-01	7.96E-02	6.17E-02
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	9.83E-02	4.70	6.47	8.90	2.09E-02	1.52E-02	1.10E-02
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	2.40E+00	1.70	2.40	3.40	1.41E+00	9.99E-01	7.06E-01
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	6.00E-01	0.20	0.26	0.33	3.00E+00	2.34E+00	1.82E+00
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	8.89E-02	12.0	26.9	60.2	7.39E-03	3.30E-03	1.48E-03
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	8.21E+00	75.4	169	377	1.09E-01	4.87E-02	2.18E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0070	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	1.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0314	= Body weight (kg)				

ATTACHMENT TABLE L-2-6
Summary of Velvet Free-Tailed Bat Exposure Doses - Screening (Step 2) - Maximum
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	3.30	0.690	2.28E+00	1.103	3.64E+00	0.126	4.16E-01	5.41E-01	0.252	0.563	1.260	2.15E+00	9.60E-01	4.29E-01
Cadmium	0.16	3.073	4.92E-01	3.250	5.20E-01	0.220	3.52E-02	1.17E-01	0.77	2.43	7.70	1.52E-01	4.80E-02	1.52E-02
Chromium	35.5	0.468	1.66E+01	0.084	2.98E+00	0.038	1.35E+00	3.95E+00	2.40	5.37	12.0	1.65E+00	7.36E-01	3.29E-01
Copper	25.9	7.957	2.06E+02	0.625	1.62E+01	0.100	2.59E+00	4.90E+01	5.60	7.23	9.34	8.75E+00	6.77E+00	5.24E+00
Lead	3.40	0.326	1.11E+00	0.468	1.59E+00	0.130	4.42E-01	2.63E-01	4.70	6.47	8.90	5.60E-02	4.07E-02	2.96E-02
Nickel	10.8	0.214	2.31E+00	1.411	1.52E+01	1.00	1.08E+01	5.49E-01	1.70	2.40	3.40	3.23E-01	2.28E-01	1.62E-01
Selenium	2.70	5.550	1.50E+01	3.012	8.13E+00	1.00	2.70E+00	3.56E+00	0.20	0.26	0.33	1.78E+01	1.39E+01	1.08E+01
Silver	0.40	0.180	7.20E-02	0.037	1.47E-02	1.00	4.00E-01	1.71E-02	12.0	26.9	60.2	1.42E-03	6.36E-04	2.84E-04
Zinc	28.4	4.759	1.35E+02	1.820	5.17E+01	1.30	3.69E+01	3.21E+01	75.4	169	377	4.26E-01	1.91E-01	8.52E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0019	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0080	= Body weight (kg)				

ATTACHMENT TABLE L-2-7
Summary of Green Heron Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	6.23E-02	5.14	8.12	12.8	1.21E-02	7.67E-03	4.85E-03
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	7.25E-03	1.47	3.29	7.35	4.93E-03	2.21E-03	9.86E-04
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	3.01E-01	2.66	5.95	13.3	1.13E-01	5.06E-02	2.26E-02
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	6.60E-01	4.05	7.00	12.1	1.63E-01	9.43E-02	5.45E-02
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	1.49E-02	3.85	8.61	19.3	3.87E-03	1.73E-03	7.75E-04
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	8.59E-01	6.71	15.0	33.6	1.28E-01	5.73E-02	2.56E-02
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	5.94E-01	1.80	4.02	9.00	3.30E-01	1.47E-01	6.60E-02
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	1.45E-02	4.04	9.03	20.2	3.59E-03	1.60E-03	7.17E-04
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	6.73E+00	66.1	148	331	1.02E-01	4.56E-02	2.04E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0230	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.290	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.710	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.187	= Body weight (kg)				

ATTACHMENT TABLE L-2-8
Summary of Spotted Sandpiper Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	2.50E-01	5.14	8.12	12.8	4.87E-02	3.08E-02	1.95E-02
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	2.80E-02	1.47	3.29	7.35	1.90E-02	8.51E-03	3.81E-03
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	2.01E+00	2.66	5.95	13.3	7.55E-01	3.37E-01	1.51E-01
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	2.95E+00	4.05	7.00	12.1	7.29E-01	4.22E-01	2.44E-01
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	5.84E-02	3.85	8.61	19.3	1.52E-02	6.78E-03	3.03E-03
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	6.04E-01	6.71	15.0	33.6	9.01E-02	4.03E-02	1.80E-02
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	1.96E+00	0.40	0.57	0.80	4.90E+00	3.47E+00	2.45E+00
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	1.01E-02	4.04	9.03	20.2	2.50E-03	1.12E-03	4.99E-04
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	1.96E+01	66.1	148	331	2.97E-01	1.33E-01	5.95E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0080	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.820	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.180	= Proportion of diet composed of sediment				
BW =	0.0404	= Body weight (kg)				

ATTACHMENT TABLE L-2-9
Summary of White-cheeked Pintail Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	3.10E-02	5.14	8.12	12.8	6.02E-03	3.81E-03	2.41E-03
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	1.54E-02	1.47	3.29	7.35	1.05E-02	4.69E-03	2.10E-03
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	2.22E-01	2.66	5.95	13.3	8.33E-02	3.73E-02	1.67E-02
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	6.16E-01	4.05	7.00	12.1	1.52E-01	8.79E-02	5.09E-02
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	1.93E-02	3.85	8.61	19.3	5.02E-03	2.24E-03	1.00E-03
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	8.22E-02	6.71	15.0	33.6	1.22E-02	5.48E-03	2.45E-03
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	1.64E-01	0.40	0.57	0.80	4.10E-01	2.90E-01	2.05E-01
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	7.88E-04	4.04	9.03	20.2	1.95E-04	8.72E-05	3.90E-05
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	2.95E+00	66.1	148	331	4.46E-02	1.99E-02	8.92E-03

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0462	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.064	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.903	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.033	= Proportion of diet composed of sediment				
BW =	0.519	= Body weight (kg)				

ATTACHMENT TABLE L-2-10
Summary of Cave Swallow Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	2.39E-01	5.14	8.12	12.8	4.65E-02	2.94E-02	1.86E-02
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	3.57E-02	1.47	3.29	7.35	2.43E-02	1.09E-02	4.86E-03
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	1.35E+00	2.66	5.95	13.3	5.06E-01	2.26E-01	1.01E-01
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	3.42E+00	4.05	7.00	12.1	8.44E-01	4.88E-01	2.82E-01
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	5.33E-02	3.85	8.61	19.3	1.38E-02	6.19E-03	2.77E-03
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	4.05E-01	6.71	15.0	33.6	6.03E-02	2.70E-02	1.21E-02
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	2.77E+00	0.44	0.81	1.50	6.29E+00	3.41E+00	1.84E+00
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	6.66E-03	4.04	9.03	20.2	1.65E-03	7.38E-04	3.30E-04
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	2.76E+01	66.1	148	331	4.17E-01	1.87E-01	8.35E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0038	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0158	= Body weight (kg)				

ATTACHMENT TABLE L-2-11
Summary of Fishing Bat Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	3.01E-02	0.252	0.563	1.260	1.19E-01	5.34E-02	2.39E-02
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	2.17E-03	0.77	2.43	7.70	2.82E-03	8.91E-04	2.82E-04
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	1.13E-01	2.40	5.37	12.0	4.72E-02	2.11E-02	9.43E-03
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	1.70E-01	5.60	7.23	9.34	3.03E-02	2.35E-02	1.82E-02
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	7.85E-03	4.70	6.47	8.90	1.67E-03	1.21E-03	8.82E-04
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	8.98E-01	1.70	2.40	3.40	5.28E-01	3.74E-01	2.64E-01
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	2.04E-01	0.20	0.26	0.33	1.02E+00	7.95E-01	6.19E-01
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	1.52E-02	12.0	26.9	60.2	1.26E-03	5.63E-04	2.52E-04
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	2.95E+00	75.4	169	377	3.92E-02	1.75E-02	7.83E-03

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0053	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	1.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0544	= Body weight (kg)				

ATTACHMENT TABLE L-2-12
Summary of Velvet Free-Tailed Bat Exposure Doses - Baseline (Step 3A) - 95% UCL
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.43	Regression	9.98E-01	Regresson	2.25E-01	0.126	3.07E-01	1.70E-01	0.252	0.563	1.260	6.76E-01	3.02E-01	1.35E-01
Cadmium	0.10	Regression	1.49E-01	Regresson	1.77E-01	0.220	2.21E-02	2.55E-02	0.77	2.43	7.70	3.31E-02	1.05E-02	3.31E-03
Chromium	30.4	Regression	5.63E+00	0.041	1.25E+00	0.038	1.16E+00	9.60E-01	2.40	5.37	12.0	4.00E-01	1.79E-01	8.00E-02
Copper	17.3	0.824	1.43E+01	Regresson	6.01E+00	0.100	1.73E+00	2.44E+00	5.60	7.23	9.34	4.35E-01	3.37E-01	2.61E-01
Lead	0.62	Regression	2.23E-01	Regresson	2.02E-01	0.130	8.01E-02	3.80E-02	4.70	6.47	8.90	8.08E-03	5.87E-03	4.27E-03
Nickel	9.16	Regression	1.69E+00	Regresson	5.67E-01	1.00	9.16E+00	2.89E-01	1.70	2.40	3.40	1.70E-01	1.20E-01	8.49E-02
Selenium	2.08	5.550	1.16E+01	Regresson	1.14E+00	1.00	2.08E+00	1.97E+00	0.20	0.26	0.33	9.86E+00	7.68E+00	5.98E+00
Silver	0.15	0.180	2.79E-02	0.014	2.17E-03	1.00	1.55E-01	4.75E-03	12.0	26.9	60.2	3.95E-04	1.76E-04	7.89E-05
Zinc	23.2	Regression	1.15E+02	Regresson	2.76E+01	1.30	3.01E+01	1.97E+01	75.4	169	377	2.61E-01	1.17E-01	5.22E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0017	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0101	= Body weight (kg)				

ATTACHMENT TABLE L-2-13
Summary of Green Heron Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	5.56E-02	5.14	8.12	12.8	1.08E-02	6.85E-03	4.33E-03
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	6.39E-03	1.47	3.29	7.35	4.35E-03	1.94E-03	8.70E-04
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	2.86E-01	2.66	5.95	13.3	1.07E-01	4.80E-02	2.15E-02
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	5.81E-01	4.05	7.00	12.1	1.43E-01	8.30E-02	4.80E-02
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	1.17E-02	3.85	8.61	19.3	3.05E-03	1.36E-03	6.10E-04
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	7.79E-01	6.71	15.0	33.6	1.16E-01	5.19E-02	2.32E-02
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	5.10E-01	1.80	4.02	9.00	2.83E-01	1.27E-01	5.66E-02
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	1.38E-02	4.04	9.03	20.2	3.41E-03	1.53E-03	6.83E-04
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	6.40E+00	66.1	148	331	9.69E-02	4.33E-02	1.94E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0230	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.290	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.710	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.187	= Body weight (kg)				

ATTACHMENT TABLE L-2-14
Summary of Spotted Sandpiper Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	2.24E-01	5.14	8.12	12.8	4.36E-02	2.76E-02	1.74E-02
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	2.50E-02	1.47	3.29	7.35	1.70E-02	7.60E-03	3.40E-03
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	1.88E+00	2.66	5.95	13.3	7.07E-01	3.16E-01	1.41E-01
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	2.60E+00	4.05	7.00	12.1	6.42E-01	3.71E-01	2.15E-01
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	4.64E-02	3.85	8.61	19.3	1.21E-02	5.39E-03	2.41E-03
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	5.54E-01	6.71	15.0	33.6	8.26E-02	3.69E-02	1.65E-02
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	1.69E+00	0.40	0.57	0.80	4.21E+00	2.98E+00	2.11E+00
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	9.60E-03	4.04	9.03	20.2	2.38E-03	1.06E-03	4.75E-04
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	1.93E+01	66.1	148	331	2.92E-01	1.31E-01	5.84E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0080	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.820	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.180	= Proportion of diet composed of sediment				
BW =	0.0404	= Body weight (kg)				

ATTACHMENT TABLE L-2-15
Summary of White-cheeked Pintail Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	2.82E-02	5.14	8.12	12.8	5.49E-03	3.48E-03	2.20E-03
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	1.38E-02	1.47	3.29	7.35	9.40E-03	4.20E-03	1.88E-03
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	2.04E-01	2.66	5.95	13.3	7.66E-02	3.43E-02	1.53E-02
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	5.76E-01	4.05	7.00	12.1	1.42E-01	8.23E-02	4.76E-02
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	1.62E-02	3.85	8.61	19.3	4.20E-03	1.88E-03	8.40E-04
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	7.57E-02	6.71	15.0	33.6	1.13E-02	5.04E-03	2.26E-03
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	1.40E-01	0.40	0.57	0.80	3.49E-01	2.47E-01	1.74E-01
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	7.50E-04	4.04	9.03	20.2	1.86E-04	8.30E-05	3.71E-05
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	2.80E+00	66.1	148	331	4.24E-02	1.89E-02	8.47E-03

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0462	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.064	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.903	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.033	= Proportion of diet composed of sediment				
BW =	0.519	= Body weight (kg)				

ATTACHMENT TABLE L-2-16
Summary of Cave Swallow Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	2.16E-01	5.14	8.12	12.8	4.21E-02	2.66E-02	1.68E-02
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	3.23E-02	1.47	3.29	7.35	2.20E-02	9.83E-03	4.39E-03
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	1.30E+00	2.66	5.95	13.3	4.89E-01	2.19E-01	9.79E-02
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	3.01E+00	4.05	7.00	12.1	7.43E-01	4.30E-01	2.49E-01
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	4.39E-02	3.85	8.61	19.3	1.14E-02	5.11E-03	2.28E-03
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	3.78E-01	6.71	15.0	33.6	5.63E-02	2.52E-02	1.13E-02
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	2.38E+00	0.44	0.81	1.50	5.40E+00	2.93E+00	1.58E+00
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	6.34E-03	4.04	9.03	20.2	1.57E-03	7.02E-04	3.14E-04
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	2.72E+01	66.1	148	331	4.12E-01	1.84E-01	8.23E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0038	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0158	= Body weight (kg)				

ATTACHMENT TABLE L-2-17
Summary of Fishing Bat Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	2.63E-02	0.252	0.563	1.260	1.05E-01	4.68E-02	2.09E-02
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	1.78E-03	0.77	2.43	7.70	2.31E-03	7.31E-04	2.31E-04
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	1.03E-01	2.40	5.37	12.0	4.30E-02	1.92E-02	8.60E-03
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	1.50E-01	5.60	7.23	9.34	2.67E-02	2.07E-02	1.60E-02
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	5.85E-03	4.70	6.47	8.90	1.24E-03	9.04E-04	6.57E-04
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	8.12E-01	1.70	2.40	3.40	4.78E-01	3.38E-01	2.39E-01
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	1.75E-01	0.20	0.26	0.33	8.77E-01	6.83E-01	5.32E-01
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	1.44E-02	12.0	26.9	60.2	1.20E-03	5.36E-04	2.40E-04
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	2.65E+00	75.4	169	377	3.51E-02	1.57E-02	7.02E-03

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0053	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	1.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0544	= Body weight (kg)				

ATTACHMENT TABLE L-2-18
Summary of Velvet Free-Tailed Bat Exposure Doses - Baseline (Step 3A) - Mean
Eastern Conservation Area, Former Vieques Naval Training Range, Vieques, Puerto Rico

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Fish Concentration (mg/kg dw)	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														
Arsenic	2.13	Regression	9.04E-01	Regresson	2.09E-01	0.126	2.69E-01	1.54E-01	0.252	0.563	1.260	6.12E-01	2.74E-01	1.22E-01
Cadmium	0.083	Regression	1.35E-01	Regresson	1.59E-01	0.220	1.82E-02	2.30E-02	0.77	2.43	7.70	2.99E-02	9.46E-03	2.99E-03
Chromium	27.7	Regression	5.44E+00	0.041	1.14E+00	0.038	1.05E+00	9.28E-01	2.40	5.37	12.0	3.87E-01	1.73E-01	7.73E-02
Copper	15.3	0.824	1.26E+01	Regresson	5.71E+00	0.100	1.53E+00	2.14E+00	5.60	7.23	9.34	3.83E-01	2.97E-01	2.30E-01
Lead	0.46	Regression	1.84E-01	Regresson	1.71E-01	0.130	5.97E-02	3.13E-02	4.70	6.47	8.90	6.67E-03	4.84E-03	3.52E-03
Nickel	8.29	Regression	1.58E+00	Regresson	5.26E-01	1.00	8.29E+00	2.69E-01	1.70	2.40	3.40	1.58E-01	1.12E-01	7.92E-02
Selenium	1.79	5.550	9.93E+00	Regresson	9.65E-01	1.00	1.79E+00	1.69E+00	0.20	0.26	0.33	8.47E+00	6.60E+00	5.13E+00
Silver	0.15	0.180	2.65E-02	0.014	2.06E-03	1.00	1.47E-01	4.52E-03	12.0	26.9	60.2	3.76E-04	1.68E-04	7.51E-05
Zinc	20.8	Regression	1.14E+02	Regresson	2.60E+01	1.30	2.70E+01	1.94E+01	75.4	169	377	2.57E-01	1.15E-01	5.15E-02

Orange shaded cell - Concentration based on detection limits; chemical not detected

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

				Invertebrates	Bivalves	Fish
DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)	Lipids (%):	2.58	1.48	6.00
FIR =	0.0017	= Food ingestion rate (kg/day dry weight)	TOC (%):	1.52	1.52	1.52
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)	Percent soilds:	0.21	0.21	0.25
PDFi =	1.000	= Proportion of diet composed of food item (aquatic invertebrates)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)				
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)				
PDFi =	0.000	= Proportion of diet composed of food item (fish)				
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)				
PDS =	0.000	= Proportion of diet composed of sediment				
BW =	0.0101	= Body weight (kg)				

Appendix M
Incremental Background Value Technical Memorandum

Appendix M
Technical Memorandum: Background Incremental Soil Summary Statistics

Background Incremental Soil Summary Statistics

Introduction

Background incremental soil data from the same lithologic unit as that at UXO 1 were collected during the UXO 1 Remedial Investigation. These data are presented in **Table 1**. An outlier evaluation was performed, resulting in the exclusion of a few of the elevated concentrations for cadmium, calcium, magnesium, selenium, and zinc though it is possible, even likely given that half the exclusions were for calcium and magnesium, that the excluded concentrations are truly representative of background. The remaining data were used to calculate 95 percent upper confidence limits of the 95th percentile, known as 95/95 UTLs. These UTLs serve as background values for comparison with the data from incremental samples collected at UXO 1.

Evaluation of Outliers

Outlier analysis was performed for all inorganics detected at least once. Per EPA guidance (EPA, 2006), Dixon's Extreme Value test (recommended for sample sizes less than 25) was used. It was applied in such a way that multiple outliers would all be identified as mathematical outliers. With multiple outliers, a given extreme value may be masked by another, slightly lower value and initially be found not to be a mathematical outlier. When testing for multiple outliers, however, both values may actually be outliers. For instance, if the lower of two elevated values was identified as an outlier, both of the values were designated as outliers.

This outlier test is based on an assumption of normality for those concentrations remaining after the statistical outlier(s) is excluded. Thus, various transformations were considered, based on the Shapiro-Wilk test (a test for normality) to achieve the best adherence to normality with the remaining concentrations (Gilbert, 1987; EPA, 2006). The data were transformed using one of three transformations. These were the square root transformation, the cubic root transformation, and the natural logarithmic transformation. The logarithmic transformation is a standard transformation in environmental applications, while the square root and cubic root transformations offer options that are appropriate for intermediate levels of data skewness.

The mathematical outliers identified via this approach are presented in **Table 2**. These concentrations were not included in the background data set used to calculate summary statistics. The transformations used for each outlier analysis are included in **Table 2**. The concentrations of the outliers relative to the other concentrations are presented in the probability plots shown in **Figure 1**. The probability plots show the actual concentrations versus the expected quantiles if the data were normal. The quantiles in these plots are the number of standard deviations from the mean. These graphs help visualize the ascending concentrations so that the most elevated concentrations can be viewed with respect to the lower concentrations. In the probability plots, detected concentrations are plotted as closed circles. Non-detects are plotted as open circles. The mathematical outliers are plotted as Xs. As seen in Figure 1, these outliers included elevated values for cadmium, calcium, magnesium, selenium, and zinc.

There is no high frequency of outliers from any particular sample. The fourteen outliers were identified in seven of the twelve samples. As noted previously, it is important to note that the outliers may actually be part of the normal background population of data. Outlier identification was performed by establishing a widely accepted, conservative significance value of 0.05 and eliminating any constituent concentration that exceeded this significance value (via the outlier test) from the background UTL calculation. While this process likely eliminates true background "upper tail" concentrations from the background UTL calculations, it does provide a conservative measure to avoid elevating the background UTLs in case outlier concentrations are not representative of background.

Summary Statistics

Using the dataset generated via the soil grouping and outlier evaluations, summary statistics for each constituent, soil type, and depth grouping are presented in **Table 3**. The statistics comprise the mean, median, standard deviation, minimum RL, maximum RL, minimum detect, maximum detect, number of detects, number of samples, and percent detects for all concentrations retained in the data set, after removal of outliers, and are reported to three significant figures.

These summary statistics include the calculation of 95 percent upper confidence limits of the 95th percentile, known as 95/95 UTLs. These background threshold values, as 95/95 UTLs, were calculated using either a distributional assumption that appeared most appropriate, or using a nonparametric (distribution free) approach when evidence for a particular distribution is not available. The distribution possibilities included the normal, lognormal, and gamma distributions.

As long as at least 60 percent of the results were detected, the distributions appearing most appropriate via ProUCL's distributional checks were used to calculate the UTL. For such cases, when data includes nondetects (NDs), ProUCL algorithms seek to apply maximum-likelihood-estimate (MLE) or regression on order statistics (ROS) techniques to provide proxy values for the NDs used in the calculation of the UTLs. When a UTL estimated using MLE or ROS techniques is possible within ProUCL's algorithms, that approach was preferred over one using alternate proxy values (e.g., one-half the detection limit). When fewer than 60% detections were available, the Kaplan Meier approach was used in lieu of establishing specific proxy values for NDs. When all results were detected, but no discernable distribution was available, a nonparametric UTL, based on ranks of the data, was applied.

For ease in locating them, the final background threshold values are presented alone in **Table 4**.

Table 1
East Vieques Multi-Incremental Background Soil Inorganics Investigation
CTO-37, ECA, Decision Unit 6
Former Vieques Naval Training Range, Vieques, Puerto Rico

Sample ID	VEECA-6SMI01-0211	VEECA-6SMI02-0211	VEECA-6SMI02T-0211	VEECA-6SMI02TT-0211	VEECA-6SMI03-0211	VEECA-6SMI04-0211	VEECA-6SMI05-0211	VEECA-6SMI06-0211	VEECA-6SMI07-0211	VEECA-6SMI08-0211	VEECA-6SMI09-0211	VEECA-6SMI10-0211
Sample Date	2/16/11	2/16/11	2/16/11	2/16/11	2/16/11	2/17/11	2/17/11	2/17/11	2/17/11	2/17/11	2/17/11	2/17/11
Chemical Name												
Total Metals (MG/KG)												
Aluminum	30,300	27,800	30,100	28,700	42,900	32,300	15,800	6,960	34,800	5,110	11,300	5,380
Arsenic	3.9	4.8	5.3	5	6.1	4.1	4.6	2.8	5.6	0.98 J	5.9	2.7
Barium	74.4	65.4	71.9	70.2	97.6	70.4	39.5	39.3	82.2	30.1	30.1	59.4
Beryllium	0.73 J	0.66 J	0.74 J	0.71 J	1.1 J	0.76 J	0.32 J	0.5 U	0.82 J	0.5 U	0.15 J	0.5 U
Cadmium	0.3 J	0.23 J	0.25 J	0.25 J	0.28 J	0.23 J	0.23 J	0.5 U	0.25 J	0.5 U	0.18 J	0.25 J
Calcium	23,500	32,900	32,900	37,300	14,400	21,300	43,200	123,000	20,200	102,000	99,600	158,000
Chromium	42.4 J	40 J	44.2 J	42 J	59.3 J	37.1	20.3	10.9	48.9 J	7.1	24.5 J	8.7
Chromium (hexavalent)	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.12 U	0.056	0.025 U	0.025 U	0.12 U	0.025 U	0.025 U
Cobalt	6.6	5.9	6.4	6.2	8.4	6.7	4.1 J	2.4 J	7.5	2.3 J	3.1 J	2 J
Copper	16.3	16	17.3	17.6	21.7	10.5 J	12.2 J	12.3 J	20	14.7 J	15.7	16.1 J
Iron	25,900	23,900	26,300	25,100	37,200	25,900	12,400	5,980	29,200	6,020	10,700	5,860
Lead	10.1	7.6	9.5	8.8	11.9	9.2 J	4.8 J	1.3 J	10	4 J	2.7 J	2.5 UJ
Magnesium	4,800	4,630	4,580	4,760	5,130	5,100	4,560	6,150	5,310	8,610	28,200	11,400
Manganese	763	552	580	588	851	544	411	364	660	205	356	317
Nickel	13	11.7	12.5	12.1	18.2	11.5	7.3	4.4 J	15.5	3.6 J	8	3.9 J
Potassium	6,530 J	6,090 J	6,360 J	6,320 J	7,870 J	7,580	3,810	1,240	7,900 J	1,380	1,650 J	1,060
Selenium	2.1 J	2 U	2 U	2 U	1.1 J	1.2 J	2 U	1.5 J	2.4 J	2 U	2 U	1.2 J
Sodium	242 J	233 J	227 J	246 J	254 J	259 J	238 J	178 J	257 J	265 J	223 J	163 J
Thallium	0.5 U	0.5 U	0.5 U	0.5 U	0.26 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	42.4	38.4	41.5	40.1	59.4	41.1	24.7	15.7	44.2	15.2	33.1	17.1
Zinc	27.2	23.6	24.3	24.1	39.2	25.3	18.6	13.5	27.5	19.5	20.2	23.5

Notes:

Shading indicates detection

J - Analyte present. Value may or may not be accurate or precise

NS - Not sampled

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

Table 2
Mathematical Outliers Excluded from Background Summary Statistics
CTO-37, ECA, Decision Unit 6
Former Vieques Naval Training Range, Vieques, Puerto Rico

Inorganic Constituent	Sample ID	Transformation [1]	Concentration (mg/kg)	Qualifier
Cadmium	VEECA-6SMI03-0211	None	0.28	J
Cadmium	VEECA-6SMI01-0211	None	0.3	J
Calcium	VEECA-6SMI09-0211	Logarithm	99600	
Calcium	VEECA-6SMI08-0211	Logarithm	102000	
Calcium	VEECA-6SMI06-0211	Logarithm	123000	
Calcium	VEECA-6SMI10-0211	Square Root	158000	
Magnesium	VEECA-6SMI06-0211	Logarithm	6150	
Magnesium	VEECA-6SMI08-0211	Logarithm	8610	
Magnesium	VEECA-6SMI10-0211	Logarithm	11400	
Magnesium	VEECA-6SMI09-0211	Logarithm	28200	
Selenium	VEECA-6SMI06-0211	Logarithm	1.5	J
Selenium	VEECA-6SMI01-0211	Logarithm	2.1	J
Selenium	VEECA-6SMI07-0211	Logarithm	2.4	J
Zinc	VEECA-6SMI03-0211	None	39.2	

Notes:

[1] Transformation used to provide closest adherence to normality by the remaining concentrations (aside from the elevated results being evaluated)

Table 3
Summary Statistics for Background Soil Inorganics
CTO 37, ECA, Decision Unit 6
Former Vieques Naval Training Range, Vieques, Puerto Rico

Inorganic Constituent	Calculated UTL	UTL Basis	Number of Detects	Number of Analyses	Percent Detects	Mean	Median	Standard Deviation	Minimum RL	Maximum RL	Minimum Detect	Maximum Detect	Excluded Outliers
Aluminum	58200	Normal UTL	12	12	100	22600	28300	13000	NN	NN	5110	42900	
Arsenic	8.47	Normal UTL	12	12	100	4.32	4.7	1.52	NN	NN	0.98	6.1	
Barium	120	Normal UTL	12	12	100	60.9	67.8	21.6	NN	NN	30.1	97.6	
Beryllium	1.16	Normal UTL	9	12	75	0.562	0.685	0.303	0.5	0.5	0.15	1.1	
Cadmium	0.299	Kaplan Meier UTL	8	10	80	0.237	0.25	0.0221	0.5	0.5	0.18	0.25	0.28, 0.3
Calcium	59500	Normal UTL	8	8	100	28200	28200	9830	NN	NN	14400	43200	99600, 102000, 123000, 158000
Chromium	79.4	Normal UTL	12	12	100	32.1	38.6	17.3	NN	NN	7.1	59.3	
Chromium (hexavalent)	0.056	Single Detect	1	12	8	0.024	0.0125	0.0209	0.025	0.12	0.056	0.056	
Cobalt	11.2	Normal UTL	12	12	100	5.13	6.05	2.23	NN	NN	2	8.4	
Copper	24.6	Normal UTL	12	12	100	15.9	16.1	3.2	NN	NN	10.5	21.7	
Iron	48900	Normal UTL	12	12	100	19500	24500	10700	NN	NN	5860	37200	
Lead	17.2	Normal UTL	11	12	92	6.76	8.2	3.75	2.5	2.5	1.3	11.9	
Magnesium	6540	Normal UTL	9	9	100	5000	4800	506	NN	NN	4560	6150	8610, 11400, 28200
Manganese	1040	Normal UTL	12	12	100	516	548	191	NN	NN	205	851	
Nickel	23	Normal UTL	12	12	100	10.1	11.6	4.7	NN	NN	3.6	18.2	
Potassium	7900	Nonparametric UTL	12	12	100	4820	6210	2790	NN	NN	1060	7900	
Selenium	1.31	Kaplan Meier UTL	3	9	33	1.06	1	0.0882	2	2	1.1	1.2	1.5, 2.1, 2.4
Sodium	338	Gamma UTL	12	12	100	232	240	31.7	NN	NN	163	265	
Thallium	0.26	Single Detect	1	12	8	0.251	0.25	0.00289	0.5	0.5	0.26	0.26	
Vanadium	71.7	Normal UTL	12	12	100	34.4	39.3	13.6	NN	NN	15.2	59.4	
Zinc	34.2	Normal UTL	11	11	100	22.5	23.6	4.16	NN	NN	13.5	27.5	39.2

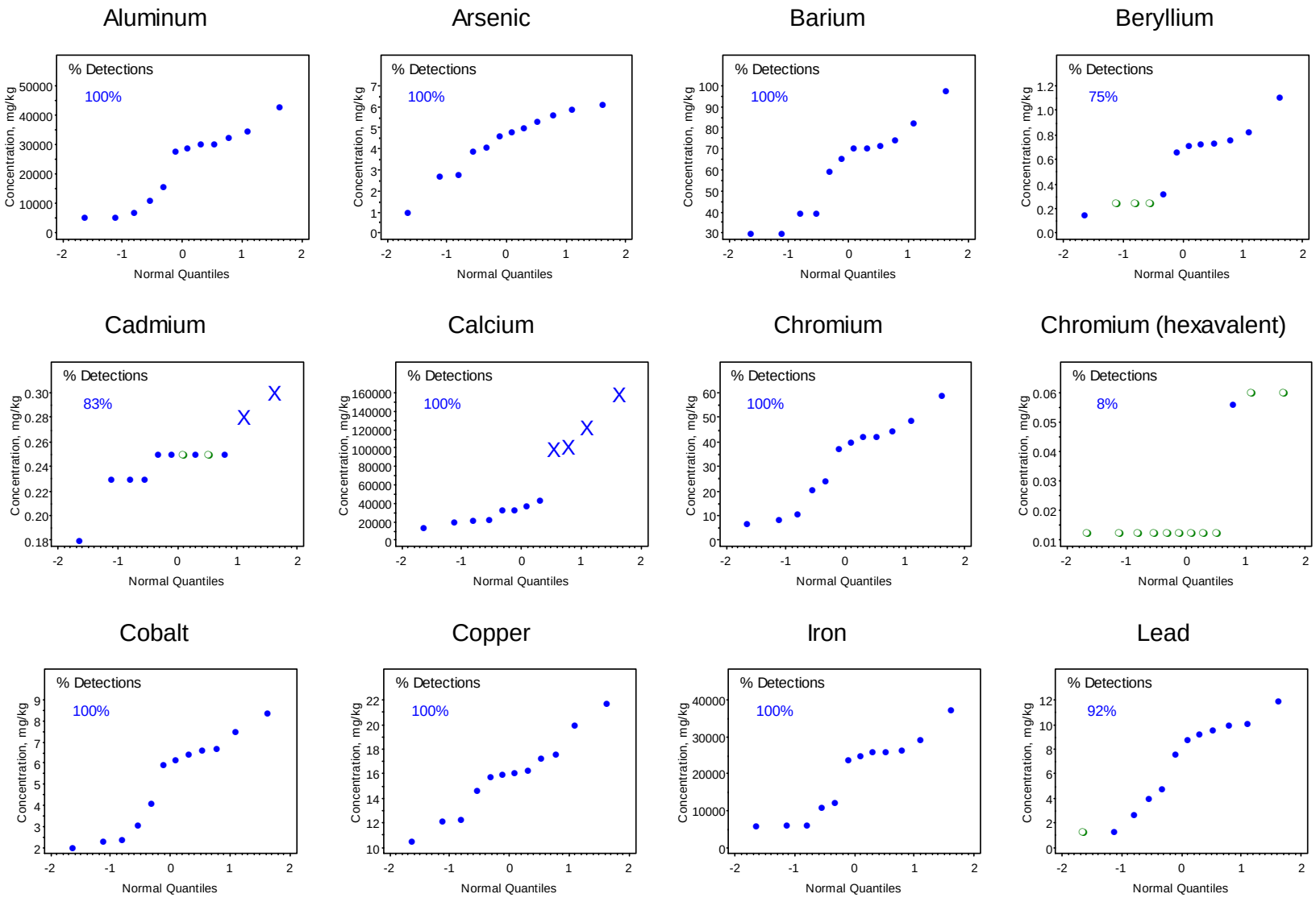
Notes:
All concentrations in mg/kg
NA * = Not applicable; no detections
RL = reporting limit
NN = not needed; all results were detects

Table 4
East Vieques Background Multiincremental Inorganic UTLs
CTO-37, ECA, Decision Unit 6
Former Vieques Naval Training Range, Vieques, Puerto Rico

Inorganic Constituent	Background Concentration UTL
Aluminum	58200
Arsenic	8.47
Barium	120
Beryllium	1.16
Cadmium	0.299
Calcium	59500
Chromium	79.4
Chromium (hexavalent)	0.056
Cobalt	11.2
Copper	24.6
Iron	48900
Lead	17.2
Magnesium	6540
Manganese	1040
Nickel	23
Potassium	7900
Selenium	1.31
Sodium	338
Thallium	0.26
Vanadium	71.7
Zinc	34.2

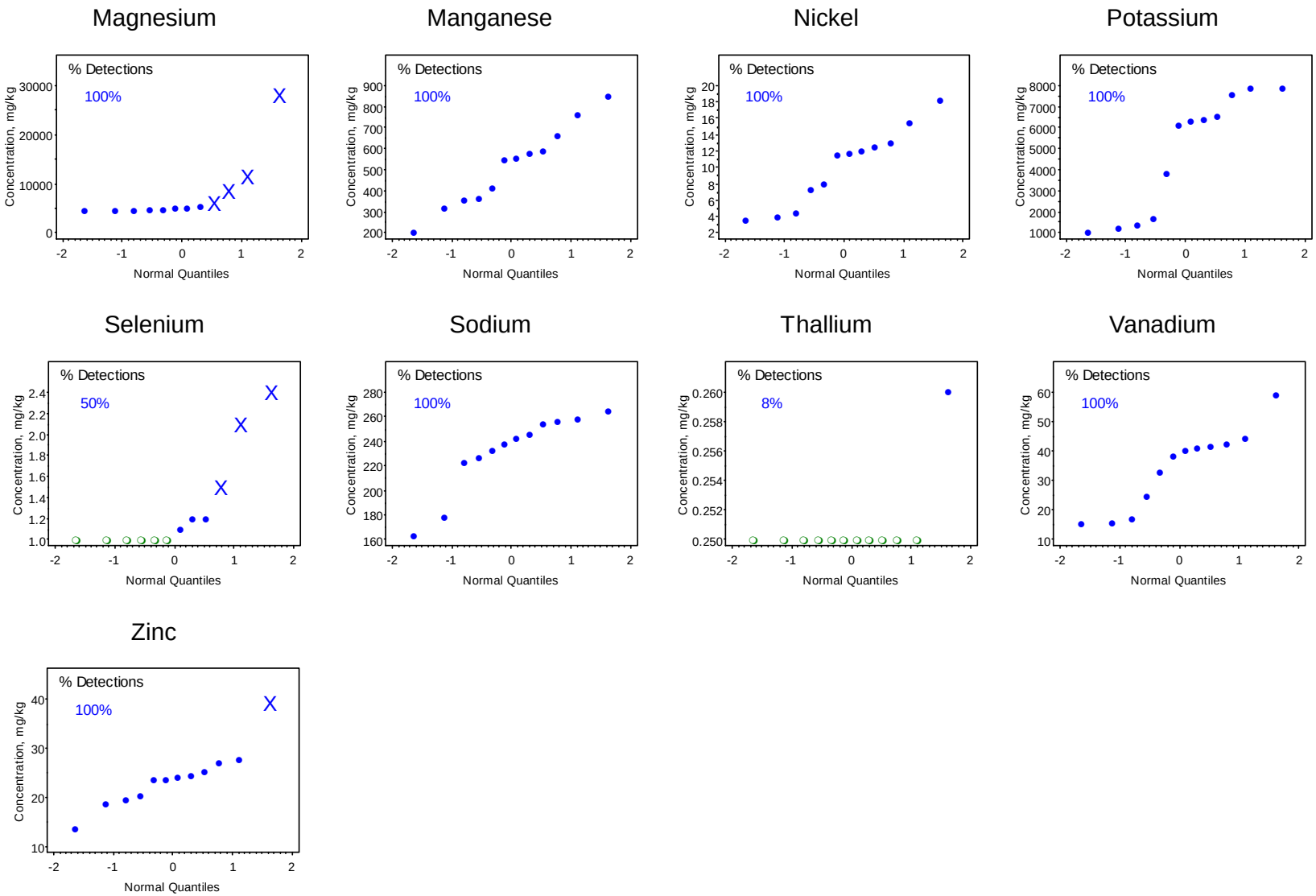
Notes:
All concentrations in mg/kg
NA = not applicable

Figure 1: Probability Plots for ECA Background



Green Open Symbol Represents 1/2 DL Proxy for Nondetects; Blue Symbol Represents Detects; X Represents Mathematical Outlier

Figure 1: Probability Plots for ECA Background



Green Open Symbol Represents 1/2 DL Proxy for Nondetects; Blue Symbol Represents Detects; X Represents Mathematical Outlier

Appendix N
Final USEPA and PREQB Response to Comments

Final Responses to
EPA Comments on the
Draft Remedial Investigation Report
UXO 1, Eastern Conservation Area (ECA),
Former Vieques Naval Training Range,
Vieques, Puerto Rico
Dated January 2012

Presented below are review comments on the *Draft Remedial Investigation Report, UXO 1, Eastern Conservation Area (ECA), Former Vieques Naval Training Range, Vieques, Puerto Rico*; dated January 2012 (RI Report).

General Comments

1. It is unclear if variations in soil type were considered when evaluating the RI data against the background data sets. Background samples should have the same basic characteristics as that of the investigation samples. Given that the RI samples were collected from areas of potentially varying soil types (upland areas, lowland areas, beach sands, lagoon fringe) it is unclear if this was the case. The Protection of Groundwater Soil Screening Levels (SSLs) calculations in Appendix H took this into account and serves as documentation of the overall soil variability. Clarify whether the background soil locations have the same basic characteristics as that of the investigation sample locations, and discuss how any differences affect background comparisons in the RI Report.

   Navy Response:

   A factor of primary importance when identifying background samples is the lithology upon which the soil is derived. The background samples were taken from the same lithologic zone (other than the beach) and similar characteristics to the ECA. Some of the background locations had characteristics of uplands and some of lowlands. Further, the background locations were agreed upon by regulatory stakeholders prior to the sampling.

2. The RI Report proposes a no further action (NFA) conclusion. This appears to be somewhat at odds with the risk assessment standard employed, as the risk conclusions drawn indicate the site poses no risk above acceptable levels for an industrial exposure scenario; a future hypothetical residential scenario (i.e., unrestricted use) was not evaluated. As such, land use controls (LUCs) must be stipulated which preclude the site from unrestricted use. The LUC requirements for unrestricted use create a conflict with the NFA determination, as implementation of LUCs is considered selection and implementation of a remedial alternative, albeit of limited scope. Nonetheless, further documentation of these requirements will be necessary beyond the RI Report. Further, the need for implementation of LUCs requires documentation. Typically, a feasibility study (FS) is prepared which presents a limited alternative assessment, which results in the selection of LUCs as the recommended remedial alternative. Finally, a LUC Plan is prepared documenting the extent of the LUCs to be implemented. As with any remedial alternative, monitoring of its success and further assessment of its viability will also need to occur. It is noted that Section 9.2.4, Land Use, indicates that UXO 1 is part of the Vieques National Wildlife Refuge for which no public access or groundwater use is intended. Should legal covenants exist as part of the establishment of the Vieques National Wildlife Refuge or governing site-use documents establish how the US Fish and Wildlife Service has already accounted the need for implementation of LUCs at the site, revise the RI Report to clarify this. Revise the RI Report so that clear documentation of how the need for LUCs is established in a manner consistent with that outlined above is provided.

Navy Response:

The second bullet in Section 9.3 has been revised as follows: "No action is warranted to address potential human and ecological receptor exposure to chemical concentrations in environmental media based on the current and future proposed land use. However, a feasibility study is warranted to address potential explosive safety risk associated with the potential presence of MEC. Alternatives evaluated in the FS will include land use controls that preclude the site from a future unrestricted land use, account for the potential presence of MEC, and are consistent with its designation as a National Wildlife Refuge."

The Memorandum of Agreement (MOA) between the Navy and DOI set forth the terms and conditions for the land transfer, pursuant to Section 1504 of Title XV of Public Law 106-398, as amended by Section 1049 of Public Law 107-107. As stated in the MOA, DOI shall record Land Use Controls, as documented in the Land Use Controls Records, on the USFWS's Land Status Map for East Vieques, or other appropriate DOI land status map.

EPA Evaluation of Response:

The response partially addresses the comment. The response indicates that Section 9.3, Conclusions and Recommendations, will be revised to state that "no action is warranted to address potential human and ecological receptor exposure to chemical concentrations in environmental media based on the current and future proposed land use." However, the RI Report should also emphasize that UXO 1 has been designated as a national wildlife refuge, and that, as such, a potential future residential land use scenario is precluded. In addition, the RI Report should explain how the land use control (LUC) instrument specified in the Memorandum of Agreement between the Navy and Department of Interior is equivalent to or supersedes that of a typical LUC (e.g., a covenant on the deed) to prevent future unrestricted use, inclusive of any use of the underlying groundwater.

Navy Follow Up Response:

The second bullet in Section 9.3 has been revised as follows: "No action is warranted to address potential human and ecological receptor exposure to chemical concentrations in environmental media based on the current and future proposed land use. Because the site is designated as part of the Vieques National Wildlife Refuge, a potential future residential land use scenario is precluded. However, a feasibility study is warranted to address potential explosive safety risk associated with the potential presence of MEC. Alternatives evaluated in the FS will include land use controls that preclude the site from a future unrestricted land use, account for the potential presence of MEC, and are consistent with its designation as a National Wildlife Refuge."

Regarding the LUC discussion, that is a matter of legal interpretation that is appropriately addressed in the remedial design.

3. It is unclear why a Dilution Attenuation Factor (DAF) is being calculated for this site. It is presumed that a DAF is proposed due to the high fraction of organic carbon (foc) detected at the site (ranging from 0.0415 to 0.104, as discussed in Appendix H, UXO 1 Leachability Evaluation using EPA's SSL Calculations). While this range of foc is admittedly very high, several mitigating factors exist that would suggest that excessive contaminant retention in the soil may not occur – namely, the shallow depth to groundwater (reported as one-foot below ground surface under the last bullet in the Physical Characteristics section of the Executive Summary) and the high solubility of nitrobenzene (reported as 2,090 micrograms per liter [mg/l] at the beginning of the second paragraph of Section 5.1.1, Solubility). Given these last two factors, it would appear that a more prudent and conservative approach to leaching would be to assume a DAF of 1. Alternatively, the site-specific DAF could be determined by analyzing several soil samples from the upper one-foot of the site with the synthetic precipitation leaching procedure (SPLP).

Navy Response:

The DAF accounts for some of the uncertainties and conservative calculations used to derive the SSLs. The DAF is independent of the fraction organic carbon. Assuming a DAF of 1 is overly conservative given that groundwater will not be used at this site, multiple fate and transport mechanisms are not accounted for in the calculations, and other conservative assumptions incorporated into the SSL calculations. As stated in the description of the derivation of the SSLs: "EPA recommends a default value of 20 as being protective of a 0.5-acre source area." Although the total size of the ECA is larger than one-half acre, source areas of contaminated soil are very small given the concentrations and distribution of chemicals found at the site (e.g., only one explosive SSL exceedance in all the surface soil samples and no explosives detected in subsurface soil samples). For very small sites (i.e., small areas of contamination), such as what may be considered for the very discrete exceedances of the SSLs observed at the ECA, DAFs on the order of 1,000 and significantly higher are predicted (EPA, 1996).

The following has been added to Appendix H:

- "The DAF accounts for some of the uncertainties and conservative calculations used to derive the SSLs such as biodegradation of organic compounds in the vadose or saturated zones and redistribution of dissolved phase chemicals to the matrix via sorption as the chemicals are transported vertically through the vadose zone then laterally through saturated zone.
- Although the total size of the ECA is larger than one-half acre, source areas of contaminated soil are considerably smaller based on the data gathered across the ECA.
- For very small sites (i.e., small areas of contamination), such as what may be considered for the very discrete exceedances of the SSLs observed at the ECA, DAFs on the order of 1,000 and significantly higher are predicted (EPA, 1996)"

EPA Evaluation of Response:

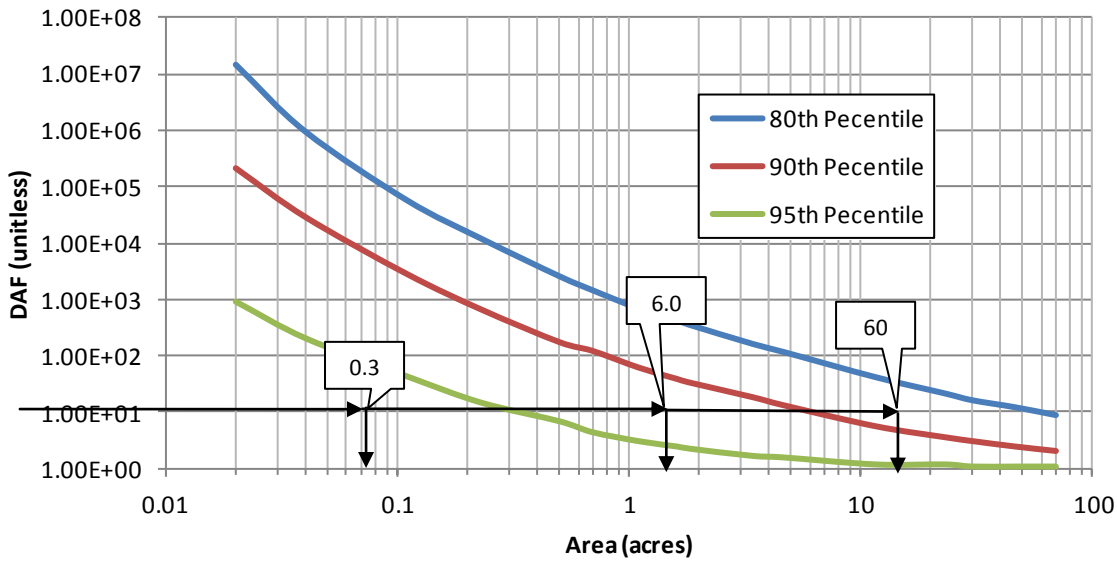
The response partially addresses the comment. The last bullet does not specifically present lines of evidence which support the proposed Dilution Attenuation Factor (DAF) of 10; at a minimum, a lines-of-evidence approach should be used to support the DAF selected for use. The lines of evidence should be site specific and technically based upon site-specific conditions or data sets which can be provided or referenced.

Navy Follow Up Response:

The lines of evidence have been described above in terms of the intentionally conservative calculations of the SSLs. The lines of evidence include:

- SSLs do not account for attenuation through adsorption as the infiltration moves vertically through the vadose zone or laterally through groundwater.
- SSLs do not account for chemical or biological degradation of chemicals
- SSLs are based on the premise that the entire vadose zone is contaminated
- Most SSLs are based on an infinite mass model

Site specific data to calculate a DAF for the ECA do not exist; however, EPA's Technical Background Document (TBD) for the Development of Soil Screening Levels (referenced above) provides the basis for demonstrating that a DAF of 10 is both conservative and protective of the environment. In order to select a default DAF for the case when site specific data do not exist, EPA conducted modeling of multiple scenarios as documented in the TBD. The modeling effort resulted in the recommendation of a default DAF of 20. The graph below illustrates the relationship of DAF to contaminated area as modeled in the TBD:



The graph above shows that a DAF of 10 is protective of a contaminated soil area of 0.3 acre with a 95 percent probability (percentile of modeled population results). At the 90th percent probability the DAF of 10 is protective of a 6 acre contaminated parcel, and at an 80th percent probability it is protective of a 60 acre contaminated parcel. The data collected at UXO 1 indicate there are only very localized occurrences of contamination (i.e., isolated occurrences of explosives (a very small fraction of the total 135-acre area), and metals attributable to background); therefore, the DAF of 10 is appropriately conservative and protective of the environment. This information has been added to the RI Report.

4. Review of Table 2-1, Summary of Samples Collected, indicates that subsurface soil samples were collected from varying depths. The RI Report does not specify at what depths background samples were collected as part of the East Vieques Background Study. Revise the RI Report specify at what depths the background samples were collected, and discuss how any differences in sample depths between that of the investigation and background samples affects background comparisons in the RI Report. Please include sample depths for the East Vieques discrete background samples in Table 5-3 Occurrence of Inorganics in Natural Soils.

Navy Response:

The last sentence of the first paragraph under "Inorganic Constituents" in Section 4.2.1 Soil has been revised as follows:

"... discrete soil sample results were compared to the discrete soil sample results from the Tl lithologic unit, as presented in the East Vieques Background Study (CH2M HILL, 2007a), in accordance with the UXO 1 SAP (CH2M HILL, 2011a). Discrete background samples were collected from the top 6 inches (surface soil) and from 6 inches to a maximum depth of 2 feet (subsurface soil), based on the depth to bedrock. Statistical analysis of this dataset indicated that, with the exception of cyanide, lead, and sodium, the surface and subsurface soil inorganics concentrations are statistically comparable. Cyanide was not detected in the UXO 1 discrete soil samples and none of the discrete soil lead concentrations exceeded screening values, regardless of depth. Therefore, the background subsurface soil dataset is appropriate for use in comparison to discrete subsurface soil data collected within UXO 1, regardless of depth."

The East Vieques discrete background sample depths have been included in Table 5-3.

5. Section 4.2.2, Surface Water and Sediment, discusses concentrations of metals detected in sediment relative to that of background soil concentrations; however, the RI Report does not provide a discussion of sediment characteristics relative to that of soil characteristics to show that they are comparable. Revise the RI Report to discuss whether sediment characteristics are comparable to background soil characteristics, and comment on the appropriateness of the comparison of sediment data to that of background soil data.

   Navy Response:

   Note that the soil within UXO 1 is derived from the limestone and dolomite bedrock that comprise the entire site upgradient, immediately adjacent to, and underlying the lagoon. This is the same type of lithology from which the soils within the background area were derived. Sediment within the lagoon consists of soil transported from the adjacent area. As discussed in Section 4.2.2 and concurred upon by the Navy and regulatory agencies, a multiple lines of evidence approach, as outlined in the ECA RI SAP (CH2M HILL, 2011a) was used to distinguish between background or potential impacts in the lagoon. Comparison with background soil was just one of the lines of evidence and its use with other lines of evidence is appropriate for this site.

   The following has been added at the end of the first paragraph under "Inorganic Constituents" in Section 4.2.2 Surface Water and Sediment:

   > "Soil within UXO 1 is derived from the limestone and dolomite bedrock that comprise the entire site upgradient, immediately adjacent to, and underlying the lagoon. Sediment within the lagoon consists of soil transported from the adjacent area. This is the same type of lithology from which the soils within the background area were derived."

6. With the exception of chromium (see Specific Comment 5), the significance (or lack thereof) of the arsenic, cobalt, and selenium exceedances of the SSLs in surface and subsurface soil samples is not discussed in Section 4.2, Nature and Extent of Environmental Media Contamination. Revise the RI Report to expand the discussion of exceedances in Section 4.2 to include an evaluation of the exceedances of the SSLs in order to meet the objectives of the RI Report.

   Navy Response:

   The existing narrative regarding arsenic provides significant evidence that the concentrations detected at UXO 1 are wholly or primarily attributable to background.

   With respect to cobalt, the following sentence has been added after the first sentence in the site-wide soil discussion:

   > "In fact, only one subsurface soil sample contained cobalt above the SSL, which suggests there is no concern regarding leaching of cobalt to groundwater on a site-wide basis."

   There were no SSL exceedances of selenium.

7. Arsenic was detected in one discrete surface soil sample (3SB02) and four discrete subsurface soil samples (2SB02, 2SB08, 2SB11, 2SB15) at concentrations which exceeded the background concentration, the adjusted Regional Screening Level (RSL) for industrial soil, and the SSL; hexavalent chromium was detected in two discrete subsurface soil samples (2SB07, 2SB09) at concentrations which exceeded the SSLs (no background concentration was available); and cobalt was detected in one discrete subsurface soil sample (2SB11) at a concentration which exceeded the background concentration and the SSL. It is unclear whether step-out samples are warranted to determine the extent of contamination in the vicinity of these sample locations. Provide specific justification for why additional sampling is not needed to define the extent of contamination at each area where constituent concentrations exceeded background concentrations and applicable screening criteria. Alternatively, propose additional soil sampling to define the extent of contamination at the site.

Navy Response:

Arsenic, cobalt, and chromium are not commonly used in munitions and are not a primary or secondary metal of the MEC/MD items encountered within the ECA, as shown in Table 1 of the ECA RI SAP. Note that Table 1 has been added to Section 4 of the ECA RI (table numbers adjusted accordingly). No step-out samples are warranted because the samples collected sufficiently characterized the areal extent of the ECA and the dataset, especially when evaluated as a whole, show insignificant levels of contamination are present.

Arsenic concentrations from 3SB02 (13.5 mg/kg), 2SB02 (14.3 mg/kg), and 2SB11 (14.3 mg/kg), were only slightly higher than the background concentration (9.2 mg/kg). Although arsenic concentrations from 2SB08 (71.8J mg/kg) and 2SB15 (20.6 mg/kg) were higher, adjacent subsurface soil samples were below background. Section 4.2.1 provides significant lines of evidence that arsenic is commonly found naturally with heterogeneous concentrations and at concentrations likely associated with natural conditions at UXO 1. The cobalt concentration from 2SB11 (19.4 mg/kg) was similar to the background concentration (15.8 mg/kg), and hexavalent chromium concentrations from 2SB07 (0.013J mg/kg) and 2SB09 (0.067J mg/kg) were similar to a concentration observed in one background incremental sample (0.056 mg/kg).

Note that a regional groundwater monitoring well is proposed within the LIA in the general area where the highest concentrations of arsenic and hexavalent chromium, as well as the only explosive concentration above a screening level (SSL), were detected in the ECA, as part of the East Vieques Master SAP

8. The "baseline" Human Health Risk Assessment (HHRA) does not evaluate baseline conditions. Unless there is a legally-transferable land use restriction (e.g., a covenant on the deed) to prevent residential development in perpetuity, the HHRA should quantitatively evaluate a future hypothetical residential scenario. Revise the HHRA to evaluate baseline conditions or provide adequate justification for not evaluating baseline conditions and consequently, consistently refer to the HHRA as a site-specific HHRA rather than a baseline HHRA. Further, please note that the Baseline HHRA Protocol for Vieques Environmental Restoration Program (finalized February 2010), indicates that future residential land use will be evaluated as part of forthcoming baseline HHRAs.

Navy Response:

Section 1.1.2 of RAGS Part A states:

> *"Baseline risk assessments are site-specific and therefore may vary in both detail and the extent to which qualitative and quantitative analyses are used, depending on the complexity and particular circumstances of the site…"*

In addition, the endnotes for Chapter 1 of RAGS state:

> *"Baseline risks are risks that might exist if no remediation or institutional controls were applied at a site."*

The HHRA protocol indicates that when sites cannot be released for unrestricted use (e.g., sites within lands Congressionally-mandated otherwise), the Navy may choose not to evaluate residential land use or other infeasible exposure scenarios. This justification is provided in Section 1.1.3 of Appendix K (the HHRA) of the RI Report.

Therefore, the term "baseline" is appropriately used in the HHRA, and the existing legal land use controls accompanying the Congressional transfer of the ECA property to the FWS render future residential land unrealistic. Further, the receptors evaluated in the HHRA were concurred upon by the regulatory agencies and documented in the ECA RI SAP (CH2M HILL, 2011a).

The following text has been added to Section 1.1.3 of the HHRA before the bullet-list of potential receptors:

"The existing legal land use controls accompanying the Congressional transfer of the UXO 1 property to the FWS render future residential land unrealistic without a subsequent Congressional act."

Additionally, revise the HHRA to address the following:

a. Revise Appendix K, Section 1.5.5, Uncertainty Analysis, to describe the complete rationale for not evaluating potential exposures related to subsurface soil and any associated impacts to the HHRA.

Navy Response:

The following revised text has been added as the second paragraph of Section 1.5.5:

"Exposure to subsurface soil was not evaluated in the HHRA because subsurface soil (depths greater than 2 feet) is not present at UXO 1 except at the Bahia Playa Blanca Beach and the Lagoon Fringe area and the potential receptors at the site would not likely be exposed to subsurface soil. Subsurface soil is generally not present in other areas (uplands and lowlands) due to the shallow depth of bedrock, although there may be some small areas where subsurface soil exists. FWS workers performing conservation activities are expected to contact surface soil only, including deeper surface soil up to 24 inches bgs. Due to the relatively inaccessible location of UXO 1 and its location within a National Wildlife Refuge, future excavation activities below 2 feet (e.g., those associated with invasive activities during site development, regrading, or construction) on the site are highly unlikely. FWS workers involved in tree planting as part of vegetation restoration may occasionally encounter locations where subsurface soil is present, but the frequency would be very seldom and the planting depths (based on observed soil profiles and likely sizes of vegetation planted) would not likely be deeper than 2 feet. Therefore, the exclusion of subsurface soil from the evaluation is not expected to impact the conclusions drawn during the HHRA or to underestimate risks from potential exposure to soil."

b. Provide the decision rationale for not evaluating groundwater exposures in the HHRA and address any associated impacts to the HHRA.

Navy Response:

The following has been added as a new paragraph to the end of Section 1.3.1:

"Groundwater at UXO1 will not be developed for potable use because of the site's location within a National Wildlife Refuge. Therefore, the groundwater exposure pathway is incomplete. Additionally, analytical data collected across the site indicate potential leaching of contaminants to groundwater on a site-wide basis is insignificant. Specifically, only one detection of one explosive in one surface soil sample was above its SSL. In fact, explosives data in soil across the site show there is not widespread explosives contamination in soil. Additionally, the concentrations of inorganics detected at the site, regardless of their relationship to screening criteria, are likely attributable to background. Therefore, groundwater was not evaluated in the RI."

9. The term "MEC (munitions and explosives of concern) avoidance" has been replaced by the term "anomaly avoidance" in the Department of Defense Ammunition and Explosives Safety Standards (DoDM 6055.09-M). Although NAVSEA OP 5, Volume 1 (Naval Sea Systems Command Ammunition and Explosives Safety Ashore, Volume 1) states in the definition of anomaly avoidance that, "Anomaly avoidance is sometimes referred to as UXO avoidance," the former is the currently accepted term per the DoD standard. Replace all occurrences of the term "MEC avoidance" with "anomaly avoidance."

Navy Response:

Section 2.1.3 First paragraph, last sentence; MEC avoidance has been changed to anomaly avoidance. In addition, the following sentence has been added at the end of the first paragraph: "Anomaly avoidance is defined using Department of Defense Ammunition and Explosives Safety Standards (DoDM 6055.09-M)."

Section 2.2, first paragraph, second sentence; MEC avoidance has been changed to anomaly avoidance.

10. The explosives sampling activities noted in the report do not indicate that samples were analyzed for Explosives D (ammonium picrate). Explosive D was the energetic filler of the Navy projectiles 5-inch and over, as well as the Army/Marine Corps APC (armor piercing-capped) projectiles (sometimes incorrectly referred to as APHE [armor piercing high explosive]) that were in use during a significant portion of the active period of the ranges at Vieques. The list of analytes does not appear to include Explosive D. Provide the basis for this omission.

Navy Response:

The explosives constituents analyzed at the ECA were developed during multiple project scoping sessions attended by the Navy, EPA, PREQB, and FWS. The list of analytes was included in the regulatory approved ECA RI SAP (CH2M HILL, 2011a). Note that explosives were infrequently detected in surface soil and were not detected in subsurface soil, surface water, and sediment. Further, there are no widely accepted human health or ecological screening levels for ammonium for the media sampled as part of the RI. This information has been added to the RI Report.

11. Water is not included in the dietary intake calculations for wildlife receptors at the ECA because permanent or semi-permanent fresh water do not exist on site. Water is not included in the dietary calculations presented in Attachment Tables L-2 and L-3 (Exposure Doses), even though it is still shown as a variable in the dietary intake equations presented in the text (Section 1.3.4, Dietary Intakes, p. L-15) and in the equation in tables L-2 and L-3. A maximum surface water concentration column is also included in these tables. It is recommended to remove all references to water as part of the dietary intake equation, including in the text and the Exposure Dose tables, to avoid confusion.

Navy Response:

The first three paragraphs of Appendix L, Section 1.3.4 have been replaced with the following:

"Upper trophic level receptor exposures via food webs to chemicals present in surface soil and surface sediment were determined using estimated chemical concentrations in each relevant dietary component for each upper trophic level receptor, as described in the previous section. Incidental ingestion of surface soil and surface sediment was also included when calculating the total exposure. Drinking water exposures were not included due to the high salinity of the lagoon.

Dietary intakes for each upper trophic level receptor were calculated using the following formula (modified from USEPA [1993]):

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

where:

DI_x	=	Dietary intake for chemical x (mg chemical/kg body weight/day)
FIR	=	Food ingestion rate (kg/day, dry-weight)
FC_{xi}	=	Concentration of chemical x in food item i (mg/kg, dry-weight)
PDF_i	=	Proportion of diet composed of food item i (dry-weight basis)
SC_x	=	Concentration of chemical x in soil or sediment (mg/kg, dry-weight)
PDS	=	Proportion of diet composed of soil or sediment (dry-weight basis)
BW	=	Body weight (kg, wet-weight)

Incidental ingestion of soil/sediment was modeled as a dietary component rather than using a separate soil/sediment ingestion rate. Parameter values for the selected receptors are listed in Tables L-15 (screening) and L-16 (baseline). When measured food ingestion rates were not available for a receptor from the literature, the rates were estimated using allometric equations from Nagy (2001)."

Attachments L-1 and L-2 have also been revised to eliminate the water components to the dose equations and are attached.

12. The discussion provided on pages G-5 and G-6 of Appendix G provides an analysis of non-detect results that exceed Screening Limits (SLs) but does not clarify if the detection limit references are all intended to reference the analytical method quantitation limit (QL), or the instrument method detection limit (MDL). Additionally, references throughout Appendix G and the Table G-1 use the term 'Detection Limit' (DL) without specifying whether the DL is a QL or MDL. Generally project detection limits are specified as QLs, but require data be reported by the laboratory to the MDL, with results that fall between the two being reported as estimated values. Provide a response and as appropriate, text revisions to clarify when DLs represent a QL or MDL, and if the DL represents a QL, why data was not reported down to the MDL.

Navy Response:

The discussion is with respect to nondetect results or "nondetect U-Values." For the purposes of the comparison, this is already defined as "LOD or detected result U-qualified due to blank contamination." Note that the use of the term "U-Value" is not intended to exclude UJ-qualified results; they are considered as well. "Detection Limit (DL)" is as defined by DoD QSM v. 4.1. For clarity, the terms QL and MDL are no longer used, although the old QL may be equivalent to the new "LOQ" and the old MDL is one way to establish the new "DL." DLs are most similar to the old MDLs because they are the lowest limits of reporting. For this project, the laboratory reported nondetect results as U-values at the LOD. Results between the LOQ and DL were reported, J-qualified as applicable. No revision to the text is necessary because the DL does not represent a QL or a MDL, and the DL is as it is defined.

13. Discussions provided in subsections G.4.1 (Precision), G.4.2 (Accuracy), and G.4.3 (Representativeness) of Section G.4 (PARCC Considerations) are general and do not provide enough information to explain how the each data quality parameter was assessed. For example, Section G.4.1 indicates that precision was assessed for sample results by comparing duplicate matrix spike recoveries, laboratory replicates, and field duplicates but does not state what criteria was used to assess the results or how this affected the data. Additionally, since Section G.4 is a separate section from discussions in G.0 (Data Quality Assessment), it appears that Section G.0 is deficient because it does not include information from any of the precision, accuracy, representativeness, completeness, comparability (PARCC) evaluations. Revise the Data Quality Evaluation (DQE) to provide additional detail in the evaluation of the PARCC parameters, and to revise the Data Quality Assessment discussion to include consideration of all data quality evaluations, including those in Section G.4 (PARCC Considerations).

Navy Response:

Discussions with respect to representativeness and comparability are general because such assessment is inherently qualitative. Discussions with respect to precision, accuracy, and completeness are general because, at this point in the data quality evaluation (i.e., in G.4), precision, accuracy, and completeness have already been discussed in detail within sections G.1.1 through G.3.3 combined with Table G-2. Minor precision and accuracy exceedances result in qualification which is largely inconsequential because the results are available for use at their reported concentration (along with the qualifier) as discussed in section G.0.3. Major precision and accuracy exceedances result in R-qualification which affects completeness. These instances are discussed in detail within sections G.1.1 through G.3.3. For example, please refer to the second and third paragraph (immediately following the table) within section G.2.1.

After noting that major accuracy and precision exceedances affected completeness, there is not much effect on the data set itself because the rejected data points are no longer available for use. Sections G.4.1, G.4.2, and G.4.3 intentionally do not provide additional information to explain how the data quality parameters were assessed because that information is already provided in the UFP-SAP which is referenced in the appendix. Please refer to UFP-SAP Worksheet #36 and then Worksheets #12s, #15s, #24, and #28s. The effects on the data, grouped by combinations of laboratory qualifier, data validation qualifier, and data validation reason code, are summarized in Table G-2 of the data quality evaluation. All sections are to be considered as a whole and together yield the appropriate information. Section G.0 is an introduction and contains information which need not be specific to combinations of site and matrix. Section G.4 is a conclusion. Sections G.1, G.2, and G.3 are specific to data groupings by site and matrix, and the data quality evaluation structure is designed so that it can easily be expanded to address additional groups of site and matrix (bigger projects with more sites and matrices). Based on the above information, the Navy feels the required elements are already present.

EPA Evaluation of Response:

The response partially addresses the comment. While it is understood that the criteria used to assess results is found in the associated Sampling and Analysis Plan (SAP), the acceptance criteria should be included or referenced. Revise the Data Quality Evaluation (DQE) to include the acceptance criteria used to assess results. Alternatively, reference the SAP and corresponding worksheet numbers in the text of the report where the acceptance criteria are located.

Navy Follow Up Response:

The following sentence is in the DQE Report: "A third-party data validator reviewed all data packages using the validation criteria outlined in the site-specific UFP-SAP Worksheets #34-36 (CH2M HILL, 2011)." Subsequent sentences in section G.0.2 go into further detail.

Specific Comments

1. **Acronyms, Page viii:** The acronym LiDAR is incorrectly defined. The correct definition is "light detection and ranging." Please make this correction.

   Navy Response:

   The acronym definition has been corrected to "light detection and ranging."

2. **Section 2.1, MEC Activities, Page 2-1:** The last paragraph in this section states that, "Although MEC technically includes MC (munitions constituents), for the purposes of this RI Report, the MEC activities involved investigation and removal of physical munitions-related material, whereas the MC activities involved the investigation of the chemical constituents of munitions." This statement is somewhat confusing. MC are classified as MEC only when they, as the MEC definition states, are "present in high enough concentrations to pose an explosive hazard." This explosive hazard concentration is generally defined as ten percent by weight in soil for secondary explosives and two percent by weight for primary explosives. All lesser concentrations of explosives in soil are considered MC that is not MEC. The only difference between the MC component of MEC and the non-MEC MC is the noted concentration in the soil. Review the cited paragraph and revise it as necessary to better explain its intent.

   Navy Response:

   The intent of the paragraph was to establish that the activities directly related to the MEC removal action did not include any investigation into MC at the site. As noted in the comment, MC is only considered

MEC if the constituents are present at a concentration high enough to present an explosive hazard. Therefore, the text in this paragraph has been revised to read as follows:

"The MEC activities involved investigation and removal of physical munitions-related material and did not evaluate site media for MC; the presence/absence of MC in the site media was conducted as part of the RI sampling activities."

In addition, the definition for MC provided in Section 2.1 has been appended to clarify that MC is only considered MEC when they constituents are present in high enough concentrations to pose an explosive hazard.

3. **Section 2.1.5, Geophysical Survey, Page 2-4:** The Geophysical Data Processing and Target Selection subsection notes that the process includes "Selection of anomaly picks (above the 2.5 mV [millivolt] level)." No basis for the selection of the 2.5 mV threshold is provided, nor is a source for this information provided. Revise the cited section to include the munition identified as the basis for this threshold and how the threshold was determined. If this information is provided elsewhere in the report, reference that location.

Navy Response:

The 2.5 mV threshold was identified in the work plan for the NTCRA *(Final Work Plan for Munitions and Explosives of Concern Subsurface Removal Action, Beaches and Select Roadways, Former Vieques Naval Training Range and Former NASD Solid Waste Management Unit 4, Vieques, Puerto Rico* [CH2M HILL, 2008]). This threshold has historically been established at the former VNTR for identifying 20 mm rounds in the subsurface.

The bullet on page 2-4 that discusses the selection of anomalies has been changed to read:

"Selection of anomaly picks (above the 2.5 mV threshold, *as specified in the NTCRA work plan [CH2M HILL, 2008*])"

4. **Section 2.1.5, Geophysical Survey, Page 2-5:** The last paragraph of the Anomaly Reacquisition and Intrusive Investigation subsection states that, "The investigation of the anomaly was considered complete once the anomaly was found and removed and the electromagnetic reading for the entire 1 meter radius around the anomaly location was below 2.5 mV, or the area was dug to the maximum depth without finding the anomaly, or the team encountered site conditions, such as bedrock or water, that prevented deeper excavation. If an anomaly was not found or the area continued to have a high reading following the investigation to the maximum depth, the anomaly identification, coordinates, and the reason for the remaining electromagnetic reading above 2.5 mV were recorded." Provide a table in Section 2 that lists all such anomalies, to include their location and the reason that they were not resolved. Also, include a figure showing these anomalies in Section 2.

Navy Response:

A total of 156 anomalies were considered no finds." The no finds can be broken down further:

- 23 were from locations where the hole was dug to depth and the source of the anomaly was not identified.
- 30 were from locations where water was encountered before reaching the source of the anomaly or the maximum clearance depth
- 103 were locations where anomalies were identified through the DGM survey but no materials were recovered from the hole. Of these 103 anomalies, 65 were locations that had been identified as anomalies by the DGM survey but when they were reacquired by the intrusive team the mV reading was below the clearance threshold of 2.5 mV.

A table and figure summarizing these anomalies is included with the RTC and has been added to Section 2.1 of the report.

5. **Section 2.2.2, Background Sampling, Page 2-10:** This section discusses background samples, but is limited to surface soil. The text should also discuss how background was addressed for sediment and surface water. Since no site-specific samples were collected to develop a background database for certain media, the text should discuss how background was evaluated.

Navy Response:

Section 2 describes the approach and methodology of the field activities. Section 4.2.2 provides the approach used to determine how background was evaluated for sediment and surface water (please see the response to General Comment #5).

6. **Figure 2-1. MEC Areas:** The figure shows areas where DGM survey could not be completed on the Beach and Road. EPA could not find any discussion in the report with an explanation for not collecting DGM data on these areas. Also, it is not clear if MEC removal was conducted on these areas.

Navy Response:

The DGM survey was conducted within the planned removal areas to the maximum extent possible. However, there are areas identified as "obscured areas" where remaining vegetation or other large obstacles (such as boulders) prevented the DGM team from being able to collect data. These areas were investigated using the "mag and dig" approach, whereby the intrusive team would use a hand-held magnetometer to identify the locations of anomalies.

To explain these areas, the following text has been added to the "Geophysical Data Collection" subsection of Section 2.1.5:

"DGM data were collected from the areas shown on Figure 2-1 to the maximum extent practicable. In some areas, identified as "obscured areas" on Figure 2-1, site features such as remaining vegetation and large rocks prevented the DGM collection team from being able to collect accurate DGM data. These areas were identified as polygons that required investigation using the "mag and dig" approach, whereby the intrusive team would use a hand-held magnetometer to identify the locations of anomalies."

7. **Section 4.2.1, Soil, Page 4-2:** Please revise the section that discusses detections of explosives in surface soil to include a discussion of whether these detections were in proximity to MEC or other anomalies identified during the geophysical investigation and clearance. This is helpful to assess nature and extent of site-related contaminants.

Navy Response:

The following sentence will be added after the last sentence of the first paragraph under the explosives subheading: "The explosives 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, HMX, and perchlorate were also detected in close proximity to where subsurface MEC was identified during the NTCRA".

8. **Section 4.2.1, Soil, Page 4-3:** The third bullet on this page states that "SSLs have shown to be unrealistic predictors of leaching to groundwater at other sites within Vieques (CH2MHill, 2010e). Therefore, hexavalent chromium is not a leaching concern for groundwater." No data have been presented which support this conclusion. Revise the RI Report to provide data which support the statement that SSLs are unrealistic predictors of leaching potential and the conclusion that hexavalent chromium is not a leaching concern.

Navy Response:

The reference to the document titled *Final Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites* is provided. The sentence will be revised to the following: "In addition, SSLs have shown to be unrealistic predictors of leaching to groundwater at other sites within Vieques (e.g., SWMU 10, PI4, PI10, etc.), where chemicals were detected in surface soil at concentrations above the SSL but were not detected in subsurface soil or groundwater (CH2M HILL, 2010e)."

EPA Evaluation of Response:

The response partially addresses the comment. The response does not provide specific evidence to support the conclusion that Soil Screening Levels (SSLs) are unrealistic predictors of leaching to groundwater and that hexavalent chromium is not a leaching concern at UXO 1 (i.e., it is unclear how the cited reference sites are similar to UXO 1 and whether the contaminants at the reference sites are the same as that at UXO 1). Revise the RI Report to provide site-specific lines of evidence which support the statement that SSLs are unrealistic predictors of leaching potential and the conclusion that hexavalent chromium is not a leaching concern, or remove the statement that SSLs are unrealistic predictors of leaching to groundwater and provide a defensible approach to assessing the migration potential to groundwater without actual groundwater data for this area.

Navy Follow Up Response:

The last three sentences of the hexavalent chromium bullet under the site-wide inorganics discussion in Section 4.2.1 have been revised to: "The above information suggests that hexavalent chromium is likely attributable to background and not a leaching concern for groundwater." This revision removes the statement: "SSLs have shown to be unrealistic predictors of leaching to groundwater at other sites within Vieques (CH2MHill, 2010e)" as it is not relevant to the point of the paragraph that no further evaluation of hexavalent chromium is necessary.

In addition, the last paragraph in the "Site-Wide (Excluding Battery Disposal Area)" subsection under "Inorganic Constituents" in Section 4.2.1 has been revised to read: "The inorganics data, especially when considered with the explosives data, show there is no widespread contamination at the site. This is demonstrated by relatively few instances of metals detected above background, the relatively few numbers of exceedances of those metals, and the relatively low magnitude of those exceedances. In fact, the data suggest that the metals concentrations at the site, regardless of their relationship to screening criteria are wholly or primarily attributable to background. Therefore, potential leaching of inorganic contaminants to groundwater on a site-wide basis is insignificant."

9. **Section 4.2.1, Soil, Page 4-3:** As discussed in the RI Report, one surface soil sample was collected from the former battery disposal area, and four metals were detected at concentrations greater than applicable background concentrations and one or more applicable screening criteria. The size of the battery disposal area is not discussed in the RI Report; therefore, it could be unclear to the reader whether one sample was sufficient to characterize the nature and extent of contamination at this area. Revise the RI Report to discuss whether the collection of one sample at the former battery disposal area is sufficient to characterize the nature and extent of contamination in light of the noted exceedances.

Navy Response:

The first sentence of the Battery Disposal Area subheading will be revised as follows: "One discrete shallow soil sample was collected to sufficiently characterize the battery disposal area, due to its small size (approximately one square foot in area) and different potential source of contamination than the rest of the site". The following statement will be added as a new paragraph at the end of Battery Disposal Area subheading: "Lead is considered to be the primary chemical of potential concern associated with the battery disposal area. Lead was detected at concentrations below the screening criteria."

10. **Section 4.2.2, Surface Water and Sediment, Page 4-4:** No background data are available for sediment and the text in the section on "Inorganic Constituents" should be revised for clarify this.

Navy Response:

The sentence in Inorganic Constituents has been revised as follows: "No background data are available for the surface water and sediment inorganic constituents from the ECA Lagoon."

11. **Figure 4-3, Explosives Detection and Exceedances in Surface Soil:** SSL are presented for the beach and for the soils, and these values are different for all of the explosives except for perchlorate, for which the SSL is 850 µg/kg for both, the beach and the soils. Verify these values are correct.

Navy Response:

The SSL values on the figure are correct. The perchlorate SSL values for the beach versus upland soils were calculated using the mass limit approach discussed in Section 1.3 of Appendix H and as stated in Section 1.5 of the appendix. .

12. **Figure 4-4, Total Metals Exceedances in Surface Soil, and Figure 4-5, Total Metals Exceedances in Subsurface Soil:** The concentrations of hexavalent chromium detected in samples 4SS01, 2SB07 and 2SB09 are shaded to indicate they exceeded the background concentration; however, the legends of the figures indicate that no background concentration for hexavalent chromium is available. Revise the RI Report to resolve this discrepancy.

Navy Response:

The East Vieques incremental background value (0.056 mg/kg), shown in Appendix M, for hexavalent chromium has been added to Figure 4-4.

Hexavalent chromium was not analyzed during the East Vieques Background Soil Inorganics Investigation; therefore, no background value is available for this criterion. A note has been added to Figure 4-5 stating, *"The hexavalent chromium exceedances shown exceed all criteria indicated by the highlighting, with the exception of the background concentration due to the lack of background concentration data for hexavalent chromium."*

Additionally, the color bar on Figure 4-5 indicating "Exceeds Vieques (East) Background Zone TI or Incremental Background" has been removed from Figure 4-4 because it is unnecessary.

13. **Section 8.3, Analytical Data Used in the ERA, Page 8-1:** Please indicate that the discrete upland deeper surface soil sample was used to evaluate the risk to the land crab, based upon the identification of land crab activity in this area.

Navy Response:

The last sentence of Section 8.3 was revised to read as follows:

"At the Upland decision unit, one discrete deeper surface soil sample (2 – 18 inches) was collected from 1 station to evaluate potential exposures for the land crab, based upon the identification of land crab activity in this area."

This change was also made to the second paragraph of Appendix L, Section 1.2.2.

14. **Section 9.2.2, Nature and Extent of Contamination, Page 9-2:** This section does not discuss the anomalies unresolved due to depth or other extenuating circumstances. Since they are unresolved, they should be

considered potential MEC until proven otherwise. Please include a discussion of these anomalies, to include their general distribution, any clustering noted, and the quantity thereof in the MEC subsection of this section.

Navy Response:

The following text has been added as a bullet to Section 9.2.2:

> "A total of 156 anomalies identified in the NTCRA area were considered "no finds." These "no finds" consisted of 23 anomaly locations hole was dug to depth and the source of the anomaly was not identified, 30 anomaly locations where water was encountered before reaching the source of the anomaly or the maximum clearance depth, and 103 were locations where anomalies were identified through the initial DGM survey but no materials were recovered from the location (65 of which were below the investigation threshold during the reacquisition process). As such, the source of the anomalies where the maximum depth was reached or water was encountered before finding the item(s) may potentially be MEC. The items where water was encountered did not demonstrate any particular pattern other than being located on the beaches. The items where the maximum depth was reached appear to be clustered in low/depositional areas at the site."

15. **Appendix G, Section G.0.5, Comparison of Nondetects to Screening Levels, Page G-6:** The discussion on page G-6 states that a non-detect value for filtered antimony in sample VEECA-5SW01-0211 is reported at a DL which exceeds the screening limit, but that sample data for the entire analysis group in that sample should be looked at as a whole to determine if other analytes in the same analysis group had detected exceedances above the screening limit(s). This assertion is a valid point and one that should be considered and discussed in the risk assessment process. However, the discussion does not discuss the quality of the data for these non-detect values. A short discussion of the data quality/usability for these non-detect results should be added. Additionally, the text states that because the other analytes in the same sample VEECA-5SW01-0211 exceeded the SL, the filtered antimony result with the elevated detection limit is largely inconsequential. It is unclear what is meant by this statement and whether the data assessment evaluation deemed the filtered antimony result usable or not. Revise Section G.0.5 to address these concerns.

Navy Response:

The discussion on page G-6 does not state that a non-detect value for filtered antimony in sample VEECA-5SW01-0211 is reported at a DL. For this project and others like it, nondetect results are never reported at the DL. It is true that detected results are reported down to the DL. It is a useful exercise to consider the proximity of the DL to the SL when the nondetect U-Value exceeds the SL.

The discussion does not discuss the data quality of the nondetect values because such discussion is already present in sections G.1.1 through G.3.3, combined with Table G-2. Rather, section G.0.5 focuses on the proximity of nondetect results to their respective SLs and how this affects the data use.

The comment refers to the following sentence on page G-6: "Therefore, because the sample exceeded for FMETALs overall, the DL v. SL exceedance for filtered antimony in VEECA-5SW01-0211 is largely inconsequential." This sentence concludes the thought process conveyed by the previous two sentences: "Therefore, one may be tempted to say that the data user cannot make sample-specific decisions for filtered metals in VEECA-5SW01-0211 because he or she cannot demonstrate that filtered antimony is absent at the HHRA screening limit. However, the data user must also acknowledge that the same sample (VEECA-5SW01-0211) exceeded the HHRA limit for filtered cobalt and filtered selenium and also exceeded the Eco limit for filtered iron and filtered copper." The point is that it does not matter whether or not one can demonstrate the absence of filtered antimony at the HHRA SL. It is not necessary to do so because at least one other constituent in the same sample already exceeds a SL from the same SL set and/or from a different SL set for other filtered metals (same analysis group). The decision does not change and, as stated earlier in the paragraph, "the data user is still forced to make a conservative decision." The net

result of this exercise is a systematic method designed to remove distractions and focus the reviewer on instances where there might actually be a data usability issue because of an error, matrix effect, inappropriate concentration range, etc.

The data quality evaluation did deem that particular filtered antimony result as available for use as evidenced by its final qualifier (U or UJ), section G.0.3, section G.3.2, and Table G-2.

16. **Appendix G, Section G.0.5, Comparison of Nondetects to Screening Levels, Page G-6:** The text in the first full paragraph of page G-6 states that Table G-1 contains a summary of results where the DL is greater than the SL. The following sentence is grammatically incorrect and incomplete, but it appears to indicate that the 'DL' represents the MDL. Re-word this second sentence in the first full paragraph on page G-6 to state whether the 'DL' in the text and in Table G-1 refers to a QL or MDL.

Navy Response:

This comment refers to the sentences "A total of 12 rows (corresponding to 86 points, shown in orange and pink) correspond to instances where the U-Value is greater than the SL and the DL is also greater than the SL. QL is greater than the SL and the MDL is also greater than the SL." The sentence "QL is greater than the SL and the MDL is also greater than the SL" was in error and has been removed. The intention was not to define the DL as the MDL and there should not be any references to the "QL" or "MDL." Please refer to response to General Comment #12, above, for information on the LOQ/LOD/DL.

17. **Appendix G, Section G.4.1, Precision, Page G-10:** This section indicates that precision was assessed for sample results by comparing duplicate matrix spike recoveries, laboratory replicates, and field duplicates, however the text does not state what acceptance criteria was used for either analytical precision, or precision for field duplicate samples. Further, this discussion does not state how the field duplicate precision was evaluated to assess how homogenous or heterogeneous the samples/media was determined to be and how this may affect the data. Revise this section to provide more detail with regards to how analytical and field sample precision was assessed and how this may affect usability of the data.

Navy Response:

The acceptance criteria are specified in UFP-SAP Worksheet 12s (for field duplicates) and UFP-SAP Worksheet 28s (for MS/MSD and LR). In addition, Region II data validation SOPs may specify criteria for qualification depending on the analysis method. If there is a precision (RPD or RSD) exceedance, then data are qualified if qualification is warranted. The resulting data qualifier along with Sections G.1.1 through G.3.3 and Table G-2 describe how such exceedances affect the data.

18. **Appendix G, Section G.4.2, Accuracy, Page G-10:** The last sentence of this section states "[T]here was not actual significant negative impact on accuracy because few data points were deemed unusable (rejected) due to accuracy exceedances (grinding blank spike recoveries)." This sentence is incomplete without information about which sample results/analytes were rejected. In order to understand how the rejected results affected the overall data quality objectives for the project, this sentence needs to be revised to provide more detail about which sample results were rejected (explosives analysis), why they were rejected (low recovery) and how this affected the overall data usability for this analysis group (explosives). Revise this section to list the analysis type, sample numbers, reason the results were rejected, whether the rejection occurred as a result of the data validation process or data quality evaluation, and how this affects the data quality objectives for the project.

Navy Response:

Results rejected due to grinding blank spike recovery (accuracy) are already discussed in detail in section G.2.1 combined with Table G-2.

Note that the rejection occurred as a result of the data validation process; it is not standard to apply R-qualifiers as part of a data quality evaluation.

19. **Appendix G, Section G.4.3, Representativeness, Page G-10:** This section indicates that representativeness was assured because the sampling team and laboratory followed approved standard operating procedures for sample collection and handling. However, the Data Quality Reports (DQRs) indicate that on a number of occasions the technical holding times for hexavalent chromium was exceeded. For example, the DQR for SDG# G1B100573 indicates that all samples exceeded the holding time by approximately 30 hours and all the reported results were qualified as estimated. Revise Section G.4.3 to include a brief discussion on any sample collection or handling issues and what affect those issues have on the data.

Navy Response:

Although Section G.4.3 is reserved for more-major exceedances, it would be useful to incorporate this information. Please note that the holding time exceedance in the comment is a minor exceedance; the holding time for aqueous hexavalent chromium is prohibitively-short: The samples in question were collected between 2/9/11 09:25 and 2/9/11 12:30. They were shipped on the day of collection and received the next morning. Then, due to a minor laboratory delay, they weren't analyzed until the next day. As a result, the data validator UJ-qualified affected nondetects as "nondetect, LOD estimated" as described in section G.0.3, section G.3.2, section G.3.3, and Table G-2. As described in Table G-2, the result is available for use at the reported LOD as long as the data user understands that it is "not detected, LOD estimated" due to a slight holding time exceedance.

Section G.4.3 has been revised to include three additional sentences at the end: "A minor exception, not affecting the availability or usability of results, applies to hexavalent chromium and filtered hexavalent chromium in surface water at decision unit 5. Samples were shipped on the day of collection, received the morning after, but due to a minor laboratory delay, were not analyzed until the following day. As described in Table G-2, the results are available for use at the reported LODs as long as the data user understands that they are "not detected, LOD estimated" due to a slight holding time exceedance."

20. **Appendix G, Table G-1, Comparison of Nondetects to Screening Levels, Page 1 of 1:** The third footnote to this table contains a '1' superscript, however there is no reference provided for the '1'. Revise this table to include the information indicated by this superscript '1'.

Navy Response:

The '1' superscript on "related exceedance" refers to the footnote at the bottom of the table which reads "At least one DL exceeds a screening level without a related exceedance[1] (detected exceedance in the sample analysis group for the same sample)." For visibility, the superscript '1' has been moved to the left side and the footnote edited to: "[1]At least one DL exceeds a screening level without a related exceedance (detected exceedance in the same analysis group for the same sample)." Note the correction of a minor typo (changed "sample analysis group" to "same analysis group").

21. **Appendix K, Section 1.1.3, Potential Receptors, Page K-2:** This section indicates that risk estimates for Fish and Wildlife Service (FWS) workers conducting surveillance, restoration and conservation activities can be used as conservative estimates of potential trespasser risks. However, according to Figure 1, Potential Exposure Pathways at Eastern Conservation Area, ingestion of crab tissue is considered a potentially complete

exposure pathway for trespassers and is evaluated qualitatively only. Ingestion of crab tissue is not considered a potentially complete pathway for the FWS worker; therefore, revise Section 1.3.1, Exposure Pathways Evaluated, to qualitatively evaluate ingestion of crab tissue by trespassers in consideration of all other relevant complete exposure pathways and contaminant inputs. For example, if trespassers were able to access the site, it appears that trespassers might also swim in the lagoon. Clarify why incidental ingestion and dermal exposure for all relevant contact media are not potentially complete exposure pathways for a trespasser, or update Figure 1 accordingly.

Navy Response:

Figure 1 of Appendix K has been modified to include the surface water (dermal contact) and sediment (incidental ingestion and dermal contact) exposure pathways for trespassers. In addition, the "Current/Future Trespassers" subsection of Section 1.1.3 has been revised as follows:

"**Current/Future Trespassers** – Occasional trespassers were qualitatively evaluated for potential exposures to site-wide surface soil (0-2 feet) through ingestion, dermal contact and inhalation. Additionally, occasional trespassers were qualitatively evaluated for potential consumption of land crab caught near the onsite lagoon, dermal contact with surface water in the lagoon, and incidental ingestion and dermal contact with sediment in the lagoon. However, trespassers are unlikely to access UXO 1 due to the inaccessible nature of the site: the site is remote, it is only accessible through the Live Impact Area, the roads that access the site are rough and unpaved, and there are not unique, appealing characteristics of UXO 1 that cannot be found in more easily accessible locations elsewhere. UXO 1 cannot be readily accessed via boat or small craft due to the shallow reef and cliff elevation. In addition, FWS law enforcement workers would arrest and remove trespassers from the site. Due to the inaccessibility of the site by potential trespassers and the likelihood they would be removed if found onsite, risk estimates for FWS workers conducting surveillance, restoration and conservation activities (and potentially contacting soil, surface water, and sediment during these activities) can be used as conservative estimates of potential trespasser risks; potential risks associated with consumption of land crab caught near the onsite lagoon are expected to be negligible for trespassers due to the very low exposure frequency anticipated for onsite trespassers."

22. **Appendix K, Section 1.2.1, Data Used in the HHRA, Page K-3:** This section indicates that subsurface soil was only sampled to "help evaluate leaching potential." Clarify in the HHRA any compounds that were detected above migration-to-groundwater soil screening levels (SSLs). Also, provide a qualitative assessment of the decreasing concentrations with depth and demonstrate no exceedances of leaching criteria.

Navy Response:

A statement has been added referring the reader to Section 4.2.1, which includes an evaluation of constituents detected above their respective SSLs.

23. **Appendix K, Section 1.2.2.3, Background Concentrations, Page K-4:** This section does not discuss how background levels at UXO 1 were established. Revise Section 1.2.2.3 to describe the data used in the background analysis and how that background levels at UXO 1 were established. Reference Appendix M, Incremental Background Technical Memorandum, and any relevant reports.

Navy Response:

A reference to Section 4.2.1 and 4.2.2 has been included.

24. **Appendix K, Section 1.3.1, Exposure Pathways Quantified, Page K-5:** It is unclear from Section 1.3.1 why incidental ingestion of surface water is not also considered a potentially complete exposure pathway for the

FWS Worker #1 (current/future FWS workers who engage in site-wide wildlife surveillance and monitoring such as migratory water fowl) and FWS Worker #5 (future FWS workers who engage in wildlife surveillance and monitoring at the lagoon fringe only). Revise this section and associated tables to clarify why incidental ingestion of surface water is not a potentially complete exposure for the FWS Worker #1 and FWS Worker #5.

Navy Response:

The second-to-last paragraph of Section 1.3.1 states: "The FWS worker activities at the lagoon consist of waterfowl monitoring and do not include activities that may lead to ingesting surface water (i.e., swimming). FWS workers at the lagoon wear waders and wade only near the lagoon edge and during kayak launching/landing." Therefore, surface water ingestion is not a reasonable exposure scenario for FWS workers. Based on discussions with FWS, a FWS worker would be expected to enter the lagoon approximately 15 percent of the time that they are in the lagoon vicinity."

The fourth sentence of the HHRA text in this paragraph has been revised as follows:

> "Therefore, surface water ingestion is not a reasonable exposure scenario for FWS workers due to the lack of activities resulting in, and limited opportunities for, incidental ingestion."

25. **Appendix K, Section 1.3.1, Exposure Pathways Quantified, Page K-6:** This section indicates that excavation activities at the site are not likely. Ensure that the uncertainty analysis is updated to address any impacts associated with failing to quantitatively evaluate subsurface exposures under subchronic intrusive activities or chronic exposures under post-regrading activities and subsequent land use.

Navy Response:

See response to General Comment #8a.

26. **Appendix K, Section 1.3.2.1, Exposure Point Concentrations, Page K-6:** Section 1.3.2.1 does not clarify the exposure point concentration (EPC) selected for surface water (i.e., maximum detected concentration [MDC]) and sediment (i.e., 95% upper confidence limit [UCL] on the mean). For completeness, clarify the EPCs selected for surface water and sediment.

Navy Response:

The first sentence of Section 1.3.2.1 has been revised as follows:

> "For each soil, sediment, and surface water COPC identified for a receptor group where eight or more samples are available in the dataset, the upper confidence limit (UCL) on the mean concentration was calculated using the most recent version of ProUCL (Version 4.1.00; EPA, 2011b) and used as the EPC."

27. **Appendix K, Section 1.3.2.2, Exposure Factors, Page K-7:** While various exposure factors utilized in the quantitative HHRA are default values, there are others that were selected based on professional judgment (e.g., the exposure frequency [EF] of 10 days/year for FWS Worker #3 performing dry forest restoration surveillance and monitoring, the EF of 3 days/year for FWS Worker #2 performing forest restoration surveillance and monitoring, amongst many other examples). Revise Section 1.3.2.2 to justify the use of those exposure factors that were selected based on professional judgment.

Navy Response:

The following text has been added to the end of the first paragraph of Section 1.3.2.2.

> "The memo sent by FWS to USEPA on February 2, 2010 entitled "Draft Human Health Risk Assessment Scenarios and Exposure Model Parameters for Fish and Wildlife Service Workers in the Eastern Conservation Area" indicates the optimum and likely exposure durations, exposure frequencies,

exposure times and number of staff that may be present in various areas of UXO 1 during various future FWS activities, assuming unlimited funding for FWS staff and activities. This summary of potential site-specific activities was developed collaboratively by FWS, USEPA, PREQB, and Navy and was used to identify conservative site-specific exposure factors. Although these site-specific exposure factor values are lower than USEPA's default values, they are expected to be conservative for the anticipated activities for future site-specific workers and visitors."

28. **Appendix L, Summary of Velvet Free-tailed Bat Exposure Doses Tables L-2-6 (Maximum), L-2-12 (95% UCL), L-2-18 (Mean).** The no observed adverse effect level, maximum allowable toxicant concentration, and lowest observed adverse effect level Toxicity Reference Values (TRVs) included in these tables are the TRVs for Birds presented in Table L-23, Ingestion-Based Toxicity Reference Values (TRVs) for Birds. The TRVs presented in Tables L-2-6, L-2-12, and L-2-18 should be the TRVs for mammals presented in Table L-22. Revise these tables to include the correct TRVs and re-calculate all hazard quotients. Also, ensure that this kind of error does not occur elsewhere in the wildlife risk calculations.

Navy Response:

Attachments L-1 and L-2 have been revised and are attached. Revised HQ tables (Appendix L, Tables L-27, L-28, L-29, L-35, L-36, and L-37) are also attached. The following text in Appendix L, Section 1.5.6.3 has also been modified as follows:

SERA (Step 2)

"HQs based upon maximum exposure doses for each upper trophic level aquatic receptor are listed in Table L-35 (calculations are shown in Attachment L-2). Based upon a comparison to NOAELs, arsenic, chromium, copper, nickel, and selenium had HQs exceeding one for one or more receptors."

In addition, the sixth and seventh paragraphs of Appendix L, Section 1.5.7.2, and the last two paragraphs of Section 8.4.2 of the main report, have been revised to read as follows:

"For selenium, MATC-based HQs were as high as 6.60 (velvet free-tailed bat; Table L-37) and the LOAEL-based HQ was as high as 5.13. However, as discussed above, selenium in lagoon sediments is not likely elevated above background levels. Further, the sediment-invertebrate BAF used in the food web model was based upon mollusks (due to the lack of data for other taxa), which are not prey items for the spotted sandpiper, cave swallow, or velvet free-tailed bat. CDWR (2006) reports a regression equation for selenium uptake from sediment to the tissues of aquatic insects (corixids) from a hypersaline water body in California (salinity of about 45 ppt, within the range observed in the ECA Lagoon; Table L-1). This equation is for an aquatic invertebrate species more likely to be consumed by the sandpiper and more representative of consumption by the two aerial insectivorous receptors. The equation is as follows:

$$\text{Insect Se Concentration (mg/kg dw)} = 10^{(0.239+(0.359*\log(\text{Se Sediment Concentration, mg/kg})))}$$

Using this equation and the mean sediment concentration of selenium (1.79 mg/kg) yields an insect tissue concentration of 2.137 mg/kg dry weight. Entering this calculated tissue concentration into the food web model (for mean exposures) would result in MATC-based HQs below one for all receptors except the velvet free-tailed bat (HQ of 1.42), whose LOAEL-based HQ also exceeded one by a small amount (HQ of 1.10). However, as discussed in Section 1.2.3.4 and Section 1.6, there is a high degree of uncertainty regarding the estimation of bioaccumulated chemicals in aerial insects that are consumed by insectivorous bats (free-tailed bat) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates and are thus likely to overestimate tissue concentrations. In addition, NIWQP (1998) reports (based upon a review of 27 studies) a preliminary toxic threshold for selenium of 2.5 mg/kg in sediment (population-based EC_{10} for fish and birds in freshwater systems); the EC_{100} for such effects was estimated to be about 4.0 mg/kg. This threshold (2.5 mg/kg) is similar to the

maximum observed selenium concentration in ECA Lagoon sediments (2.7 mg/kg) and above both the 95% UCL (2.08 mg/kg) and mean (1.79 mg/kg) sediment concentrations in the lagoon. For these reasons, selenium is not considered a COC for aquatic food web exposures at the site."

EPA Evaluation of Response:

The calculation for the selenium concentrations using the insect selenium equation to determine body burdens to insectivores and then subsequent risk to insectivorous bats (velvet free-tailed bat) should be included in a table for Appendix L.

Navy Follow Up Response:

A table (Table L-38) showing these calculations has been added to Appendix L.

Final Responses to
PREQB Technical Review of the Draft Remedial Investigation Report, UXO 1, Eastern Conservation Area (ECA), Former Vieques Naval Training Range, Vieques, Puerto Rico, Dated January 2012

General Comments

1. The ECA is described in many sections of this report (see the ES Introduction and description of Nature and Extent, Section 1 Introduction, and Sections 1.2.2, 4.1, 6.2, 9.2.2) as "not known to have been used as a target area for munitions, however the site is located adjacent to the Live Impact Area (LIA) (UXO Sites 2, 3, and 4), where naval gunfire and air-to-ground (ATG) training activities occurred from the 1970s through 2003. Therefore, munitions and explosives of concern (MEC) and other munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target." This description of the ECA doesn't include some of the historical facts concerning the ECA that should be noted in the RI including:

   - From Section 2.2.1 of the Draft Final Preliminary Range Assessment Report, April 2003): "The 1983 Memorandum of Understanding between the Navy and the Commonwealth of Puerto Rico established provisions for the reduction in the use of live ordnance at VNTR and for the protection of the environment. This resulted in the establishment of conservation zones to protect tropical ecosystems within the VNTR. One of the conservation zones was the Eastern Conservation Area (ECA), located at the easternmost 200 acres of the VNTR." This statement establishes that the ECA wasn't established until 1983 and it is possible that it was used as a target prior to that time.

   - From Section 2.2.3.4 of the same document cited above: "The Eastern Conservation Zone, encompassing 200 acres on the eastern tip of Vieques, was not an operational area for munitions use. However, its close proximity to the LIA, where extensive naval gunfire and AT bombing took place, identifies the ECA a potential area for MEC impacts. In addition, the OB/OD area within the LIA generated an explosive safety arc that extended well into the ECA." This statement:

     - Supports the statements in the RI Report that the ECA was not an operational area for munitions use, but the PRA Report doesn't provide documentation for this conclusion.
     - Identified the ECA as a potential area for MEC impacts from LIA targets.
     - Establishes that the ECA is within the explosive safety arc for the OB/OD area in the LIA.

     Describing the ECA as "not directly used as an ordnance target but still part of the range fan or bombing impact areas of targets in the LIA and also within the explosive safety arc of the OB/OD area in the LIA", or some similar text that includes these concepts is recommended.

     Navy Response:

     While it is possible that the ECA was used as a target area prior to its being designated a conservation zone, there are no records of targets being established in that area like there are for the LIA. In addition, the pattern of munitions found in the ECA (decreasing quantity away from the LIA boundary) support the supposition that MEC/MD found in the ECA is, at least in part, a result of missing targets in the LIA.

     Section 1.2.2 has been revised to read:

     > ". . . where naval gunfire and air-to-ground (ATG) training activities occurred from the 1970s through 2003. In addition, the open burn/open detonation (OB/OD) area within the LIA generated an explosive safety arc that extended well into the ECA. Therefore, MEC and other

munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA."

The first sentence of the first paragraph after the bullets in Section 4.1 has been revised to read:

"UXO 1 was not designated as a target area for ATG bombing and naval gunfire, but was located adjacent to the LIA. MEC and other munitions-related material identified within UXO 1 were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA."

The second paragraph of Section 6.2 has been revised to read:

"Although UXO 1 did not contain any targets used during the training activities at the former VNTR, munitions consistent with the use of the former LIA as a target area are present within UXO 1, as evidenced by the results of the TCRA and NTCRA. Munitions were not known to have been intentionally fired at or dropped in the UXO 1 area, but instead were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA. Regardless, a wide variety of high explosive, low explosive, and incendiary material has been recovered from the surface and subsurface at the site."

The last sentence of the first paragraph of Section 9.2.2 has been revised to read:

"Most of the MEC and other munitions-related material were most likely from munitions directed toward the LIA that missed their intended target or due to kick-out from the OB/OD area within the LIA."

2. Please revise figures ES-8, 2-3, and 4-3 through 4-7, as applicable to address the following:

- The icons for MEC are so small they are difficult to find.
- The green icon for bombs is the same color as the green background for "evergreen scrub" making it nearly impossible to find.
- The lines used on the map as boundaries for the various environmental areas are different thickness than the lines in the legend (see the "lagoon fringe" line for a good example) making the lines on the map appear to be different colors than those used in the legend.
- Some of the notations (such as VEECA-4DU15) cover some of the MEC icons.
- The MEC counts don't appear to be correct. There are MEC and munitions scrap counts of "0" in some grids that have MEC or MD icons showing that MEC or MD was found there and some of the numbers of MEC/MD icons shown in the grids don't agree with the anomaly count number.
- The land areas are in a similar color to the surrounding ocean.

Navy Response:

The icons for MEC were designed for the plot size maps, and are that size so that where they are numerous, they do not cover over each other.

The green bomb icons have been changed to black.

The lines on the legend and the map are the same, the ones on the map have other black sampling unit lines below some of them.

VEECA-4DU15 label has been moved slightly, as has Upland 8 VEECA-4DU08, Upland 5 VEECA-4DU05, and Lagoon Fringe 3 VEECA-3DU03.

MEC counts are based on the number of data base entries. Some data base entries for one GPS coordinate have multiple items at that location (for example one GPS coordinate may have 5 MD items at

that location, only one MD symbol would be placed on the map at that location). There were nine items that had grid IDs differing from the GPS coordinates. These errors have been corrected.

The best choice air photography we use does have little contrast between the water and land because the water is so clear.

3. According to Worksheet #17 of the UXO 1 RI SAP, each decision unit was divided into sampling units. Within each sampling unit, 100 subsamples were to be collected as part of the multi-incremental sampling approach. According to the logs provided in Appendix B, this approach was used for the field samples. Please explain why the background samples were collected using many more subsamples than the field samples (between 100- 255 subsamples per quadrant as per logs provided in Appendix B which is 400-1020 subsamples per location). According to Worksheet #17, the background samples were to be collected using the same protocol as the field samples.

Navy Response:

The primary objective of incremental soil sample collection is to collect about 1 kilogram of soil, which was confirmed in the field using a scale. One hundred locations is just an estimate of the number of subsamples required to produce about 1 kilogram of soil. In instances where bedrock was particularly shallow or the soil density may have been low, additional subsample locations were collected to get sufficient sample weight for the laboratory method.

Page-Specific Comments

1. Page ES-3, Executive Summary, Environmental Media: As the final paragraph of the Executive Summary mentions that over 900 analyses were performed, it would be helpful to add that the 27 multi-incremental samples were each comprised of 100 or more subsamples.

Navy Response:

Executive Summary, Environmental Media, the second sentence has been changed to: "A total of 27 incremental surface soil (composed of 100 or more subsamples), 9 discrete……."

2. Figure ES-9: The Executive Summary indicates that trespassers and Coast Guard Workers are also current/future receptors. It appears they are not included on this Conceptual Site Model. Please clarify.

Navy Response:

Trespassers and Coast Guard Workers have been added to Figures ES-9 and 5-1.

3. Figure 1.1 presents two maps in one with an enlarged insert but the two maps are not separated and can be viewed as one. It is unlikely that anyone familiar with Vieques will be confused by this map; however, it is potentially confusing and can be improved by clearly showing the overall area and the enlarged inset as two separate maps. Also, the dashed line running between St. John and the British Virgin Islands isn't explained and can probably be removed without any loss of content.

Navy Response:

Figure ES-1 and 1-1 have been revised to add a boundary around the upper portion of the map to separate it from the lower portion. In addition, the dashed line has been removed.

4. Section 2.1.5:

   a. This section includes a statement that "The EM-61 records voltage output from both coils (Channel B and Channel T data)". It is unusual to refer to EM-61 "channels" as "B" and "T" as "B" and "T" appear to indicate "bottom" and "top" coils. Usually "channels" refers to the four separate time gates that are recorded by the EM-61 MK2. Please revise this section to describe which version of the EM-61 was used and clarify what is meant by "channels B and T".

      Navy Response:

      The sentence before the statement provided in the comment defines the channels as ". . . the source/receiver coil ("B"– bottom coil) located below a second receiver coil ("T"– top coil)." The data streams from these coils is described in the text as indicated with "Channel B" data being from the bottom coil and "Channel T" data coming from the top coil.

      The device used to collect the data was an EM-61 MK 2. The text has been revised to include the "MK 2."

      Evaluation of Response:

      This is a minor point but the response doesn't fully address the comment. The comment, restated, is that there are four "channels" or time gates associated with the EM61 MK2. Calling the top and bottom coils "channels" is somewhat confusing. Differentiating data from the top and bottom coils is possible to do without referring to the data from these coils as "channels". This would be preferable because using the term "channels" to describe a coil may be confused with the data from the four time gate "channels". Making this change is recommended.

      Navy Follow Up Response:

      The following revised wording has been added to Section 2.1.5:

      "The Geonics EM61-MK2, a high-resolution time-domain electromagnetic detector, was utilized for the DGM survey. The standard EM61-MK2 system consists of two air-cored, 1 m by 0.5 m (3.3- by 1.2-foot) coils, a digital data recorder, batteries and processing electronics. The EM61-MK2's transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. Each of the two spatially separated receiver coils is capable of measuring these induced eddy currents. The EM61-MK2 offers the ability to measure the eddy currents at three distinct time intervals in the bottom coil or four intervals if no top coil measurements are recorded. Secondary voltages induced in both coils are measured in millivolts (mV). The arrangement of coils is such that there is a vertical separation of 40 cm (15.7 inches). To obtain as much information about the decay of the induced EM signal as possible, the top coil was not used for this DGM survey; rather data were recorded at four bottom coil time gates. The EM61-MK2 system was operated in the litter mode, with the coils mounted on two long poles and carried by a team of two with shoulder harnesses. The electronics, battery, and an integrated data logger were carried in a small operator backpack."

   b. Page 2-5: This section describes recording the reasons and locations for "no finds" (anomalies that were not found or the area continued to have a high reading following investigation to maximum depth). But this data on these unresolved anomalies is not presented in the RI Report. How many unresolved anomalies were recorded and what are their locations? How many had indications that there were larger anomalies deeper than the investigation depth? Please provide the information on the unresolved anomalies for agency review so they can be reviewed to determine if any of them warranted investigation to deeper depths to ensure the safety of future users of the roads in the ECA.

      Navy Response:

      A total of 156 anomalies were considered "no finds." The no finds can be broken down further:

- 23 were from locations where the hole was dug to depth and the source of the anomaly was not identified.
- 30 were from locations where water was encountered before reaching the source of the anomaly or the maximum clearance depth
- 103 were locations where anomalies were identified through the DGM survey but no materials were recovered from the hole. Of these 103 anomalies, 65 were locations that had been identified as anomalies by the DGM survey but when they were re-acquired by the intrusive team the mV reading was below the clearance threshold of 2.5 mV.

A table and figure summarizing these anomalies is included with the RTC and has been added to Section 4.1 of the report.

5. Section 2.1.7: This section is on QC but there is no documentation of QC provided in the report. This section says that the three-phased inspection program was implemented. At a minimum, please include documentation of the preparatory, initial and follow-on inspections and other required QC documentation (geophysics equipment checklists, field log books, etc.) in an appendix as documentation that the QC performed on the project met the requirements of the work plan.

Navy Response:

The documentation of the various inspections and other necessary QC checks has been compiled and included as an Appendix.

Evaluation of Response:

This response is acceptable. However it is noted that the QC data has not yet been made available for review.

Navy Follow Up Response:

The QC data referenced was collected as part of the Non-Time Critical Removal Action for the subsurface removal of MEC. This information will be presented in a separate status report that will be made available for regulatory review.

6. Page 2-8, Section 2.2.1:

a. Please use different terminology in referring to the multi-incremental samples versus the incremental samples that make up the multi-incremental samples. For example, the second paragraph on this page defines subsamples as increments and indicates that over 100 were collected in each sample unit. The first sentence of the Beach Decision Unit section states that two incremental samples were collected.

Navy Response:

The incremental surface soil sample nomenclature will remain the same, but has been noted that it is the same as a sampling unit. The increments that make up the incremental samples have been denoted as subsamples to prevent confusion.

b. To assist in clarifying how subsamples (increments) relate to the sampling unit samples, please add text after the first sentence of the second paragraph on this page that clarifies that the subsamples collected within each sampling unit are composited to form the 1,000-gram sample representative of that sampling unit.

Navy Response:

The following has been added after the first sentence of the second paragraph on Page 2-8: "The subsamples are composited as one incremental soil sample to be homogenized by the analytical laboratory."

c. As the subsections that follow provide detail on the depth of the samples. Therefore, please add a discussion of the conservative nature of collecting the subsamples from the top 2 inches as representative of surface soil, considered to be 0-1 or 0-2 feet bgs.

Navy Response:

The following has been added after the second paragraph on Page 2-8: "Energetic and inorganic chemicals associated with munitions releases on ranges primarily occur as particulates deposited heterogeneously on the soil surface, primarily from propellant residues at firing points, explosive residues near detonations in impact areas, and from controlled detonations. The highest concentrations are present near the ground surface with the vast majority in the top inch or two. Therefore, incremental sampling at ranges focuses on the top 2 inches of soil and represents the most conservative exposure depth interval for human health and terrestrial ecological receptors."

7. Page 2-9, Section 2.2.1, Lagoon Decision Unit: The text states that all sediment samples were collected to a depth of 6 inches bgs. However, as per the logs provided in Appendix A, sediment samples from 5SD12 and 5SD13 were collected to a depth of 3 inches bgs. Please clarify these exceptions in the text.

Navy Response:

2.2.1 Sampling Approach and Methods, Lagoon Decision Unit, second paragraph, the first sentence has been changed to "…to a depth of 6 inches bgs (refusal at two locations at 3 inches bgs)."

8. Table 2-2:

a. This table appears to document that 112 MEC (determined by adding all of the MEC listed on the table) were found on the surface of the ECA when Section 4.1 and Table 4-1 document that 1,308 MEC were recovered from the surface. Please clarify.

Navy Response:

Table 2-2 presents the MEC identified within each sampling unit whereas Section 4.1 and Table 4-1 present the MEC recovered from across the entire site. Table 2-2 is named "MEC/MD Removed During Surface Clearance;" however, that title is not accurate as the sample units are only representative areas across the site. Therefore, to help prevent confusion with what is presented in Table 2-2, the title has been changed to "MEC/MD Removed from the Sampling Units During Surface Clearance."

b. Uses terminology (munitions scrap) that is not defined in Section 2.1. Please define.

Navy Response:

The numbers for "munitions scrap" are representative of the number of MD and RRD items recovered from those areas. The column heading has been revised to read "MD and RRD Quantity."

c. Doesn't include data for the Lagoon decision unit. Please clarify.

Navy Response:

The lagoon decision unit will be added to the table.

9. Figure 2-1 shows "obscured areas" in the road NTCRA data. Please explain why portions of the road were inaccessible.

Navy Response:

The areas identified as "obscured areas" are locations where remaining vegetation or other large obstacles (such as boulders) prevented the DGM team from being able to collect data. These areas are within the 25 foot buffers on the sides of the road and not in the actual road bed.

To explain these areas the following text will be added to the "Geophysical Data Collection" subsection of Section 2.1.5:

"DGM data was collected from the areas shown on Figure 2-1to the maximum extent practicable. In some areas, identified as "obscured areas" on Figure 2-1, site features such as remaining vegetation and large rocks prevented the DGM collection team from being able to collect accurate DGM data. These areas were identified as polygons that required investigation using the "mag and dig" approach, whereby the intrusive team would use a hand-held magnetometer to identify the locations of anomalies."

10. Figure 2-2: Please clarify if any detonation event areas identified on this figure are located within sampling units.

Navy Response:

Four of the six detonation events took place within sampling units:

- The detonation event on 3/28/2008 was within sampling unit 4DU11
- The western detonation event on 9/30/2008 was within sampling unit 4DU09
- The eastern detonation event on 9/30/2008 was within sampling unit 4DU12
- The detonation event on 12/9/2008 was within sampling unit 4DU13

A figure has been created and attached to the RTCs to show the overlapping sampling units and detonation events.

Because this was considered when designing the sampling units, the following sentence will be added to the end of the first paragraph in the "Upland Decision Unit" subsection of Section 2.2.1:

Four of the sampling units include locations where detonation events occurred:

- The detonation event on 3/28/2008 was within sampling unit 4DU11
- The western detonation event on 9/30/2008 was within sampling unit 4DU09
- The eastern detonation event on 9/30/2008 was within sampling unit 4DU12
- The detonation event on 12/9/2008 was within sampling unit 4DU13

11. Figure 2-4: Please identify the various geologic units types shown on this figure.

Navy Response:

Figure 2-4 has been revised to include the geologic units Ti-Tertiary limestones and dolomites, Qb-beach and dune deposits, Qa-alluvial deposits, and KTd-plutonic rocks, largely granidiorite and quartz diorite.

12. Figure 2-6: It appears that the surface soil samples discussed in Section 2.2.1 for the Lowland Area are not shown on this figure although a symbol for a surface soil sample location is included in the legend.

Navy Response:

The symbols for sample locations 2SB03 and 2SB13 have been changed in Figure 2-6 to surface soil samples.

13. Page 3-1, Section 3.1.2: Please clarify which portion of the perimeter is at 0 feet above mean sea level, as the perimeter surrounds the entire site.

Navy Response:

3.1.2 Topography, second paragraph, first sentence has been revised to "…at the perimeter (i.e., ocean boundary)…"

14. Page 3-2, Section 3.1.5: Please clarify the site conditions that result in groundwater being tidally influenced except at the lagoon (which this report indicates is not tidally influenced), where groundwater is located within 1 foot bgs. This comment also applies to the Executive Summary. Note that during the February ERP Meeting, the Navy indicated that a clay layer is present which results in the formation of perched water. Please add this information to the text of the report to clarify the hydrogeology at the lagoon.

Navy Response:

Section 3.1.3, the 2nd sentence has been modified to read: "During the ecological setting evaluation of the lagoon, it was noted that a clay layer underlies the lagoon. This clay layer restricts or prevents hydraulic connection between the surface water in the lagoon and the underlying groundwater. This hydraulic barrier, as well as the physical barrier between the ocean and the lagoon, account for the lagoon not being tidally influenced and the presence of water in the lagoon being wholly or mostly the result of precipitation." This information has also been added to the Executive Summary.

15. Section 4.1 notes that 97 MEC were found during the NTCRA of 16 acres (see Section 2.1.5 for that information). If the ECA is 133 total acres this means that the calculated remaining subsurface MEC (assuming that the subsurface MEC distribution for the NTCRA area is representative) is as follows:

$$133 \div 16 = 8.3 \text{ X } 97 = 805$$

If this reasoning is correct then it is important for decision-makers to know that there is an estimated 800+ MEC remaining in the subsurface of the ECA. Please include this information in the analysis of MEC contamination.

Navy Response:

The text has been revised to include the density of MEC identified during the NTCRA and extrapolate the number for the remaining areas within the ECA. The number calculated in the comment includes the 97 items already removed from the site; therefore, the number presented in the text has been changed to 708 MEC.

The following text has been added to the discussion of the nature and extent of MEC:

> "The overall density of subsurface MEC recovered at UXO 1 during the NTCRA was approximately 6 MEC per acre. Given that 16 of the 133 acres within UXO 1 were subsurface cleared of MEC, if the 6 MEC per acre average is consistent across the site, there are approximately 708 subsurface MEC items remaining at the site."

16. Page 4-3, Section 4.2.1, Last Bullet: The text states that the maximum concentration of selenium was 2.2 mg/kg at the beach (sample 1DU01). However, as per Table 4-3, the concentration of selenium at the beach (sample 1DU01) is 1.4 mg/kg. The maximum concentration of selenium was 1.9 mg/kg, detected in surface soil sample 4DU10 and subsurface soil sample 2SB05. Please revise the text accordingly.

    Navy Response:

    Section 4.2.1, last bullet, first sentence has been revised to read "Selenium exceeded the background concentration (1.3 mg/kg for both surface and subsurface soil) and ecological screening criterion (0.5 mg/kg) in 12 of the 74 samples, with a maximum concentration of 1.9 mg/kg in the upland (4DU10) in surface soil, and 1.9 mg/kg in the lowland (2DU05) subsurface soil sample."

17. Section 4 Tables: Minor comment – the HHRA references the June 2011 version of the RSL table and these tables present the May 2011 RSLs. Please consider updating the document to the same version for the final document only for consistency.

    Navy Response:

    The tables have been updated with the June 2011 RSLs.

18. Table 4-5: The ecological marine surface water screening value for total arsenic is incorrectly presented as 1.4 µg/L. The correct value should be 36.0 µg/L. Please correct the total arsenic screening value and revise the exceedances in this table as necessary.

    Navy Response:

    The ecological marine surface water screening value for total arsenic has been revised to 36 µg/L. In addition, Section 4.2.2, second bullet has been revised to:

    "Total and/or dissolved arsenic concentrations exceed a screening criterion (RSL for tap water of 0.045 µg/L) at each surface water sample, with a maximum concentration…"

19. Figure 4-6: The ecological marine surface water screening value for total arsenic is incorrectly presented as 1.4 µg/L. The correct value should be 36.0 µg/L. Please correct the total arsenic screening value and revise the exceedances in this figure as necessary.

    Navy Response:

    Figure 4-6 has been revised to present the ecological marine surface water screening value as 36 µg/L. The shading in the concentration boxes has been revised as necessary.

20. Table 5-2: This table summarizes constituents which exhibited results above screening criteria. Please add hexavalent chromium to this table as there were exceedances of this analyte in the soil matrix.

    Navy Response:

    Table 5-2 has been updated with hexavalent chromium.

Appendix G: Data Quality Evaluation

1. Section G.2.1, Page G-8: Please correct the typographical error in the discussion of the rejected explosives results: 3-nitrotoluene is discussed twice instead of including nitrobenzene in the second part of the discussion.

Navy Response:

The fifth sentence in the second paragraph on page G-8 has been updated to read: "For Nitrobenzene in incremental soil, there were 29 rejected nondetects associated with one or more failing grinding blank spikes and seven available nondetects associated with one or more passing grinding blank spikes."

Appendix H: SSL Calculation Details

1. Please note that EPA's DAF of 20 for a half-acre site applies to aquifers that have homogeneous and isotropic properties. EPA notes that the DAF may not be applicable to fractured or karst aquifer types. Therefore, please provide other lines of evidence for the use of the DAF of 10 for this site. It may be useful to note that for very small sites, such as what may be considered for the very discrete exceedances of the SSL at the ECA, DAFs on the order of 1,000 and significantly higher are predicted (refer to Table 5 of the SSL Technical Background Guidance). This supports the overly conservative nature of the DAF selected, along with the lack of contamination detected in subsurface soil.

Navy Response:

The following information has been added to Appendix H regarding selection of the DAF of 10:

- The DAF accounts for some of the uncertainties and conservative calculations used to derive the SSLs such as biodegradation of organic compounds in the vadose or saturated zones and redistribution of dissolved phase chemicals to the matrix via sorption as the chemicals are transported vertically through the vadose zone then laterally through saturated zone.
- Although the total size of the ECA is larger than one-half acre, source areas of contaminated soil are considerably smaller based on the data gathered across the ECA.
- For very small sites (i.e., small areas of contamination), such as what may be considered for the very discrete exceedances of the SSLs observed at the ECA, DAFs on the order of 1,000 and significantly higher are predicted (EPA, 1996)

Appendix K: Human Health Risk Assessment

1. Page K-7, Section 1.3.2.2:

   a. Please revise the last sentence of the first paragraph to state that conservative site-specific exposure parameters were developed.

   Navy Response:

   The last sentence of the first paragraph has been revised to indicate:

   "No default exposure factors have been established for FWS workers; therefore, conservative site-specific exposure factors were established by EPA, PREQB, FWS, and the Navy and presented in the SAP (CH2M HILL, 2011c)."

   b. For transparency and to support the development of site-specific exposure parameter values, please add text that presents the supporting rationale for each site-specific exposure parameter, and discuss why the selected values are considered conservative. As this document will become part of the public record, it is important that the HHRA document the basis for these values with sufficient detail so a reader understands the conservative nature of values that appear far lower than EPA's default values. Note that currently, the report explains these values via a footnote to the RAGS Table 4s in Attachment K-1, which states "Exposure duration, exposure frequency, and exposure time selected during the EPA/PREQB/FWS conference call on February 11, 2010 concerning RME scenarios for FWS Workers at ECA." More transparency in the process is needed. Note that the Navy also participated in that teleconference.

Navy Response:

The following text has been added to the end of the first paragraph of Section 1.3.2.2.

"The memo sent by FWS to USEPA on February 2, 2010 entitled "Draft Human Health Risk Assessment Scenarios and Exposure Model Parameters for Fish and Wildlife Service Workers in the Eastern Conservation Area" indicates the optimum and likely exposure durations, exposure frequencies, exposure times and number of staff that may be present in various areas of UXO 1 during various future FWS activities, assuming unlimited funding for FWS staff and activities. This summary of potential site-specific activities was developed collaboratively by FWS, USEPA, PREQB, and Navy and was used to identify conservative site-specific exposure factors. Although these site-specific exposure factor values are lower than USEPA's default values, they are expected to be conservative for the anticipated activities for future site-specific workers and visitors."

The RAGS Table 4 series was revised to indicate that Navy participated in the conference call (see attached tables).

Appendix L: Ecological Risk Assessment

1. Page L-24, §1.5.7.2, 4th Paragraph: The highest MATC-based and LOAEL-based HQs for the aquatic habitats are reported for the cave swallow (HQs = 4.2 and 2.97, respectively). However, higher HQs would be calculated for the velvet free-tailed bat using the correct mammalian TRVs (see comment below). The text within this section should be revised as necessary after recalculating HQs for this bat.

Navy Response:

Attachments L-1 and L-2 have been revised and are attached. Revised HQ tables (Appendix L, Tables L-27, L-28, L-29, L-35, L-36, and L-37) are also attached. The following text in Appendix L, Section 1.5.6.3 has also been modified as follows:

SERA (Step 2)

"HQs based upon maximum exposure doses for each upper trophic level aquatic receptor are listed in Table L-35 (calculations are shown in Attachment L-2). Based upon a comparison to NOAELs, arsenic, chromium, copper, nickel, and selenium had HQs exceeding one for one or more receptors."

In addition, the sixth and seventh paragraphs of Appendix L, Section 1.5.7.2, and the last two paragraphs of Section 8.4.2 of the main report, have been revised to read as follows:

"For selenium, MATC-based HQs were as high as 6.60 (velvet free-tailed bat; Table L-37) and the LOAEL-based HQ was as high as 5.13. However, as discussed above, selenium in lagoon sediments is not likely elevated above background levels. Further, the sediment-invertebrate BAF used in the food web model was based upon mollusks (due to the lack of data for other taxa), which are not prey items for the spotted sandpiper, cave swallow, or velvet free-tailed bat. CDWR (2006) reports a regression equation for selenium uptake from sediment to the tissues of aquatic insects (corixids) from a hypersaline water body in California (salinity of about 45 ppt, within the range observed in the ECA Lagoon; Table L-1). This equation is for an aquatic invertebrate species more likely to be consumed by the sandpiper and more representative of consumption by the two aerial insectivorous receptors. The equation is as follows:

$$\text{Insect Se Concentration (mg/kg dw)} = 10^{(0.239+(0.359*\log(\text{Se Sediment Concentration, mg/kg})))}$$

Using this equation and the mean sediment concentration of selenium (1.79 mg/kg) yields an insect tissue concentration of 2.137 mg/kg dry weight. Entering this calculated tissue concentration into the food web model (for mean exposures) would result in MATC-based

HQs below one for all receptors except the velvet free-tailed bat (HQ of 1.42), whose LOAEL-based HQ also exceeded one by a small amount (HQ of 1.10). However, as discussed in Section 1.2.3.4 and Section 1.6, there is a high degree of uncertainty regarding the estimation of bioaccumulated chemicals in aerial insects that are consumed by insectivorous bats (free-tailed bat) using standard invertebrate uptake models, which typically do not consider the emergent forms of invertebrates and are thus likely to overestimate tissue concentrations. In addition, NIWQP (1998) reports (based upon a review of 27 studies) a preliminary toxic threshold for selenium of 2.5 mg/kg in sediment (population-based EC10 for fish and birds in freshwater systems); the EC100 for such effects was estimated to be about 4.0 mg/kg. This threshold (2.5 mg/kg) is similar to the maximum observed selenium concentration in ECA Lagoon sediments (2.7 mg/kg) and above both the 95% UCL (2.08 mg/kg) and mean (1.79 mg/kg) sediment concentrations in the lagoon. For these reasons, selenium is not considered a COC for aquatic food web exposures at the site."

2. Tables L-35, L-36 and L-37: The selenium HQs for the velvet free-tailed bat presented in these tables are based on avian TRVs and not mammalian TRVs. Please correct the HQs for this receptor and correct the mammalian selenium TRV in these tables and in Tables L-2-6, L-2-12 and L-2-18.

Navy Response:

Please see the response to the previous comment.

Appendix N: MEC Hazard Assessment

1. For the "amount of MEC input factor" please explain why "safety buffer" was selected rather than "target area" or "OB/OD area". If the ECA was part of the down-range impact area for long shots on a target in the LIA, it is still part of that target even though the actual target was not located in the ECA. This comment also applies to the OB/OD area. If kickouts are expected to land in the ECA from the OB/OD area then it is part of the OB/OD area just as the entire kickout arc for SWMU 4 was identified as part of the OB/OD area. A "safety buffer" designation describes an area that is totally outside of the range fan or calculated OB/OD kickout area not intended to receive MEC from these activities. It is more likely that the ECA was intended to receive MEC even though targets may not have been located there.

   Please consider these two issues and determine if there is a potential impact on the MEC HA score and subsequent hazard assessment for the ECA.

Navy Response:

The MEC HA defines the three potential designations for UXO 1 as:

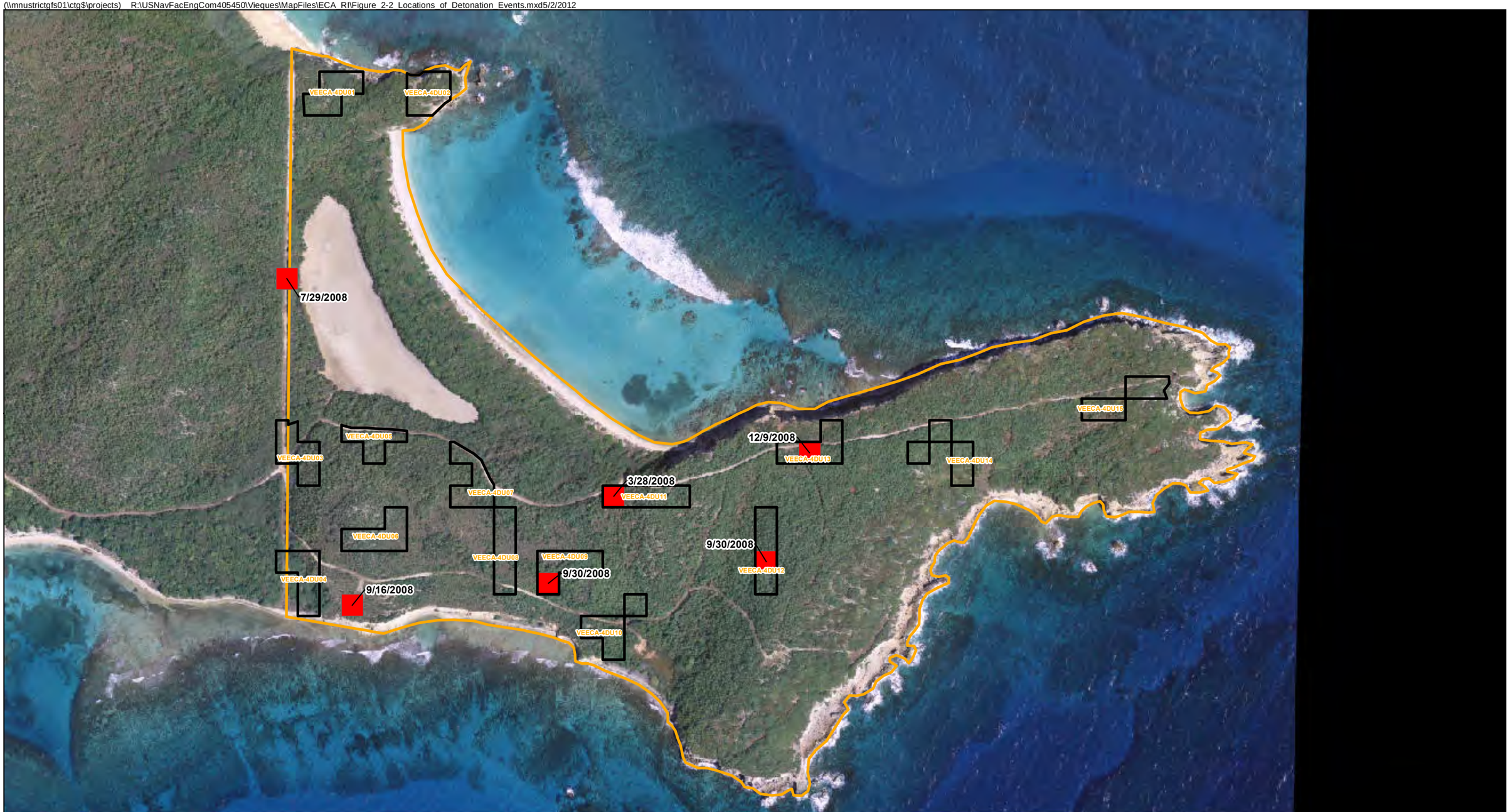
- Target Area - Areas at which munitions fire was directed
- OB/OD Area - Sites where munitions were disposed of by open burn or open detonation methods. This category refers to the core activity area of an OB/OD area. See the "Safety Buffer Areas" category for safety fans and kick-outs.
- Safety Buffer Areas - Areas outside of target areas, test ranges, or OB/OD areas that were designed to act as a safety zone to contain munitions that do not hit targets or to contain kick-outs from OB/OD areas

Given these definitions, the designation of "safety buffer area" was selected for UXO 1 because it seemed to be the most appropriate. There were no targets within UXO 1 and the area was not used as part of the core OB/OD operations; rather, UXO 1 is an area where munitions that missed targets landed/came to rest and kickouts from OB/OD activities potentially landed. The definition of "safety buffer area" within

the MEC HA appears to be consistent with and address the concerns in the comment that overshots for targets in the LIA and kickouts from the OB/OD area may be encountered in the ECA. However, based on discussions during the February 2012 Vieques Technical Subcommittee meeting, the designation of UXO 1 has been revised to "Target Area." Due to this change the score for the baseline conditions increased such that the Hazard Level increased in severity from a 3 to a 2. The scores for the current conditions increased but the Hazard Levels remained the same. The revised MEC HA has been included in the report.

Above is the response originally provided for the comment however, upon further evaluation based on the potential for misinterpretation of the utility of the MEC HA calculation it has been removed from the RI Report.

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\ECA_RI\Figure_2-2_Locations_of_Detonation_Events.mxd5/2/2012



Decision Unit (Area of Multi Increment Sampling)

Detonation Events

ECA Boundary

N
W E
S

0 200 400
Feet

Figure x-x
Locations of Detonation Events
Eastern Conservation Area Remedial Investigation Report
Former VNTR, Vieques, Puerto Rico

CH2MHILL