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Final

Site Inspection/Expanded Site Inspection Report Addendum PI 7, PAOC Q, and PAOC R

Former Vieques Naval Training Range (VNTR) Vieques, Puerto Rico

Prepared for

Department of the Navy

NAVFAC ATLANTIC

Contract No.
N62470-08-D-1000
CTO-113

June 2011

Prepared by

CH2MHILL®

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Final

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Contract Task Order 113

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Department of the Navy
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Under the

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Tampa, Florida

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Acronyms and Abbreviations

amsl	above mean sea level
B(a)P	Benzo(a)pyrene
bgs	below ground surface
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
COPC	constituent of potential concern
CSM	conceptual site model
DAF	dilution attenuation factor
D(a,h)A	dibenz(a,h)anthracene
DDE	dichlorodiphenyldichloroethene
DQE	Data Quality Evaluation
DRO	diesel range organics
EBS	Environmental Baseline Survey
ELCR	excess lifetime cancer risk
EPA	United States Environmental Protection Agency
EQB	Environmental Quality Board
ERI	Environmental Research Inc.
ESI	Expanded Site Investigation
FID	flame ionization detector
ft	foot or feet
ft^2	square feet
GPS	global positioning system
GRO	Gasoline Range Organics
HHRA	Human Health Risk Assessment
HI	Hazard Index
HSA	Hollow Stem Auger
HQ	hazard quotient
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
MS/MSD	matrix spike / matrix spike duplicate
NAVFAC	Naval Facilities

PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Inspection
PAOC	potential area of concern
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
PI	photo identified
PID	Photoionization detector
Ppm	parts per million
PREQB	Puerto Rico Environmental Quality Board
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSL	Regional Screening Level
SAP	Sampling and analysis plan
SB	subsurface soil sample
SI	Site Investigation
SO	Soil boring location or composite soil sample
SS	surface soil sample
SSL	soil screening level
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbon
UFP-SAP	Unified Federal Policy Sampling and Analysis Plan
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTL	upper tolerance limits
UXO	unexploded ordnance
VNTR	Vieques Naval Training Range
VOC	volatile organic compound

Executive Summary

The objective of a Site Inspection (SI) is "release assessment." More specifically, an SI is intended to:

- Determine whether a release of hazardous waste or hazardous constituents has occurred from past Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities and, if so,

Determine whether a suspected release warrants further action

An Expanded SI has generally the same objective as an SI, but differs in that historical data collected during an SI suggest additional data are necessary to draw the release assessment conclusions with sufficient certainty.

This report summarizes the results, evaluation, conclusions, and recommendations of the Supplemental Site Inspection/Expanded Site Inspection (SI/ESI) conducted for 3 sites (shown on **Figure ES-1**) within the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico, conducted in accordance with the *Site Inspection/Expanded Site Inspection Sampling and Analysis Plan, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2009), hereafter referred to as the SI/ESI SAP, and the *Final Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2010), hereafter referred to as the SI/ESI Report. This report is an addendum to the SI/ESI Report and, therefore, supplements the information contained in the SI/ESI Report.

One of the sites is a photo-identified (PI) site and two sites are potential areas of concern (PAOCs), identified via historical aerial photograph analysis or from other historical records.

PI 7, the site of a former quarry, tar drum disposal area, and radar communication area underwent an ESI in 2009, the results, conclusions, and recommendations of which are presented in the SI/ESI Report (CH2M HILL, 2010). The site was previously investigated via an SI (or equivalent investigation), and the results, conclusions, and recommendations are presented in the *Final Preliminary Assessment/Site Inspection Report, 12 Consent Order Sites and 8 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2008). The SI/ESI Report (CH2M HILL, 2010) recommended additional sampling at the location of a previously collected sample (PI7-3) because the original sample was collected near a deteriorating rubber hose, and was not likely representative of the area as a whole. Therefore, a co-located surface soil and subsurface soil sample was collected during the Supplemental ESI at the location of former sample PI7-3. Therefore, evaluation of PI 7 data focuses on only the immediate area of the resampling that was conducted during the supplemental ESI. Information regarding the northern and southern subsections of PI 7 and the central subsection areas outside of the PI7-3 vicinity can be found in the Final SI/ESI Report (CH2M HILL 2010).

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NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HA HECHO TODO LO POSIBLE 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.

Sites PAOC Q and PAOC R were evaluated via an SI based on information regarding past activities there; the results, conclusions, and recommendations of the SI can be found in the SI/ESI Report (CH2M HILL, 2010). The report recommended that the SI sample locations be re-sampled because cover material from road improvement activities was included in several of the samples collected. Therefore, not all samples were representative of the soil present during historical activities. To address this, one co-located surface soil and subsurface soil sample was collected from each site during the Supplemental SI.

In accordance with the SI/ESI SAP (CH2M HILL, 2009) and SI/ESI Report (CH2M HILL, 2010), the soil data collected during the supplemental investigation were evaluated via the 7-step decision analysis process displayed in **Figure ES-2**.

The outcome of the 7-step decision analysis process is a conclusion of whether a CERCLA-related release likely occurred and, if so, whether the suspected release warrants further action. If no CERCLA-related release is suspected, or if the data suggest a release does not warrant further action (including following source area elimination), then preparation of a no action or no further action decision document is recommended. If a CERCLA-related release is suspected that warrants further action, recommendation for the further action is made.

For each of the 3 sites investigated during the Supplemental SI/ESI, the site history; data collection activities; results of the data evaluation, including the 7-step decision analysis; and conclusions and recommendations are summarized in Table ES-1. As shown in the table, the following is recommended for each of the sites:

No Action/No Further Action (Preparation of a No Action/No Further Action Decision Document)

- PI 7
- PAOC Q
- PAOC R

The data evaluations upon which these recommendations are made are detailed in site-specific sections contained in this report.

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Resumen Ejecutivo

El objetivo de la Inspección del Sitio (SI, por sus siglas en inglés) es llevar a cabo una "evaluación de un derrame/escape". Más específicamente, un SI trata de:

- Determinar si ha ocurrido un escape/derrame de una sustancia peligrosa o componentes peligrosos, como resultado de actividades relacionadas a la Ley de Responsabilidad, Compensación y Respuesta Ambiental Completa (CERCLA, por sus siglas en inglés)y, de ser el caso,
- Determinar si el escape/derrame en cuestión requiere de alguna acción adicional .

Un SI Expandido generalmente tiene el mismo objetivo de un SI, pero difiere en que los datos históricos recolectados durante un SI, sugieren que se necesitan más datos para llegar a una conclusión más certera de la evaluación del derrame/escape.

Este informe resume los resultados, la evaluación, conclusiones y recomendaciones de la Inspección del Sitio Adicional/Inspección del Sitio Expandida (SI/ESI, por sus siglas en inglés) para 3 sitios (como se muestra en la **Figura ES-1**) que se encuentran dentro del Antiguo Campo de Adiestramiento Naval de Vieques (VNTR, por sus siglas en inglés) en Vieques, Puerto Rico, las cuales se llevaron a cabo de acuerdo con el *Site Inspection/Expanded Site Inspection Sampling and Analysis Plan, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2009), que desde aquí en adelante se le mencionará como SI/ESI SAP, y con el *Final Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2010), que desde aquí en adelante se le mencionará como Informe SI/ESI. Este informe es un adenda al Informe SI/ESI, por lo tanto suplementa la información que se encuentra en el Informe SI/ESI.

Uno de los sitios fue identificado por fotografía (PI, por sus siglas en inglés) y dos sitios son áreas de preocupación potencial (PAOCs, por sus siglas en inglés), que se identificaron por medio del análisis de fotografías aéreas históricas o de otros registros históricos.

PI 7, es el sitio de una antigua cantera, área de disposición de barriles de brea , y un área de comunicaciones de radar para el que se realizó un ESI en el 2009. Los resultados, conclusiones, y recomendaciones del ESI se presentan en el Informe SI/ESI (CH2M HILL, 2010). El sitio fue previamente investigado durante un SI (o una investigación equivalente), y los resultados, conclusiones, y recomendaciones se presentan en el Informe *Final Preliminary Assessment/Site Inspection Report, 12 Consent Order Sites and 8 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2008). El Informe SI/ESI (CH2M HILL, 2010) recomendó que se tomaran muestras adicionales en la misma localidad donde se tomó la muestra (PI 7-3), debido a que la muestra original se tomó cerca de una manguera de goma deteriorada, y posiblemente no era representativa de toda el área. . Por esta razón, se tomó una muestra co-localizada de suelo superficial y suelo sub-superficial durante el ESI Suplementario en el mismo sitio de la antigua muestra PI 7-3. De ahí que, la evaluación de los datos de PI 7 se concentra solamente en el área inmediata

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donde re muestró durante el ESI suplementario. La información relacionada a las sub-secciones norte y sur de PI 7, y la sub-sección central fuera de las inmediaciones de PI7-3, están disponibles en el Informe Final SI/ESI (CH2M HILL 2010).

Los sitios PAOC Q y PAOC R fueron evaluados durante un SI en base a la información sobre actividades pasadas en estos sitios; los resultados, conclusiones y recomendaciones del SI están disponibles en el Informe SI/ESI (CH2M HILL, 2010). El informe recomendó que se vuelvan a tomar muestras en los mismos lugares del SI ya que varias de las muestras recogidas eran del material de relleno que se usó para mejorlos caminos. Por lo tanto no todas las muestras eran representativas del suelo presente durante las actividades históricas Para atender esto, durante el SI Suplementario se tomó una muestra co-localizada de suelo superficial y una de suelo sub-superficial de cada sitio.

De acuerdo con el SI/ESI SAP (CH2M HILL, 2009) y el Informe SI/ESI (CH2M HILL, 2010), los datos de suelo obtenidos durante las investigación suplementaria se evaluaron siguiendo el proceso de análisis de 7 pasos, que se muestra en la **Figure ES-2**.

Los resultados del proceso de análisis de 7 pasos son una conclusión sobre la posibilidad de que exista u ocurra un escape/derrame relacionado a CERCLA, y si ese es el caso, determina si las áreas donde se sospecha hubo el derrame requieren de alguna acción. Si no se sospecha que ha habido un derrame relacionado a CERCLA, o si los datos sugieren que el derrame no amerita más acción (incluyendo la eliminación de la fuente), entonces se recomienda la preparación de un documento de decisión de no acción o ninguna acciona adicional. Si se sospecha ha habido un derrame relacionado a CERCLA que amerita alguna acción, se hacen recomendaciones para acciones adicionales en el sitio.

Para cada uno de los 3 sitios investigados durante el SI/ESI Suplementario, la historia del sitio; las actividades de recolección de muestras; los resultados de la evaluación de datos, incluyendo el proceso de análisis de 7 pasos; y las conclusiones y recomendaciones se resumen en la Tabla ES-1. Como se muestra en la tabla, se recomienda lo siguiente para cada uno de los sitios:

No Acción/Ninguna Acción Adicional (Preparar un Documento de Decisión de No Acción/Ninguna Acción Adicional)

- PI 7
- PAOC Q
- PAOC R

La evaluación de datos en la que se basan estas recomendaciones se detallan en las secciones específicas para cada sitio, las cuales se encuentran en este informe.

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Table ES-1
Summary of Conclusions and Recommendations
Site Inspection/Expanded Site Inspection Addendum Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Site Name	Site Description	Site History	Potential Source(s)	Potential Release Mechanism(s)	Site-specific Data Collected	Results of 7-step Decision Analysis	Conclusions	Recommendations
PI 7 (Central Subsection in PI7-3 Vicinity)	Former Quarry	Defunct rock quarry	Miscellaneous debris, including drum	Spills or leaks to the ground surface	5 co-located surface soil and subsurface soil samples and 6 additional surface soil samples	Data suggest potential source area was sufficiently characterized	Supplemental ESI data indicate historical PAH data for PI7-3 are not representative of current conditions; no SVOCs detected in Supplemental ESI samples; the results indicate that there has not been a CERCLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document
PAOC Q	Former Boiler Room in Heat Plant Building 607	Boiler room in building constructed in 1963 and demolished in 1984	Boilers	Spills or leaks to ground surface	1 co-located surface and subsurface soil samples and 1 additional surface soil sample	Data suggest potential source area was sufficiently characterized	SI (2009) surface soil sample was collected from cover material placed by USFWS during road improvement activities; therefore SI subsurface soil sample was deemed representative of historical surface soil, and a co-located suface soil and subsurface soil sample was collected during the Supplemental SI; the results indicate that there has not been a CERLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document
PAOC R	Former Boiler Room in Heat Plant Building 617	Boiler rooms in building constructed in 1970 and demolished in 1984	Boilers	Spills or leaks to ground surface	1 co-located surface and subsurface soil sample	Data suggest potential source area was sufficiently characterized	SI (2009) surface soil sample was collected from cover material placed by USFWS during road improvement activities (no subsurface soil sample was collected due to refusal); therefore, a co-located suface soil and subsurface soil sample was collected during the Supplemental SI/ESI; the results indicate that there has not been a CERCLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document

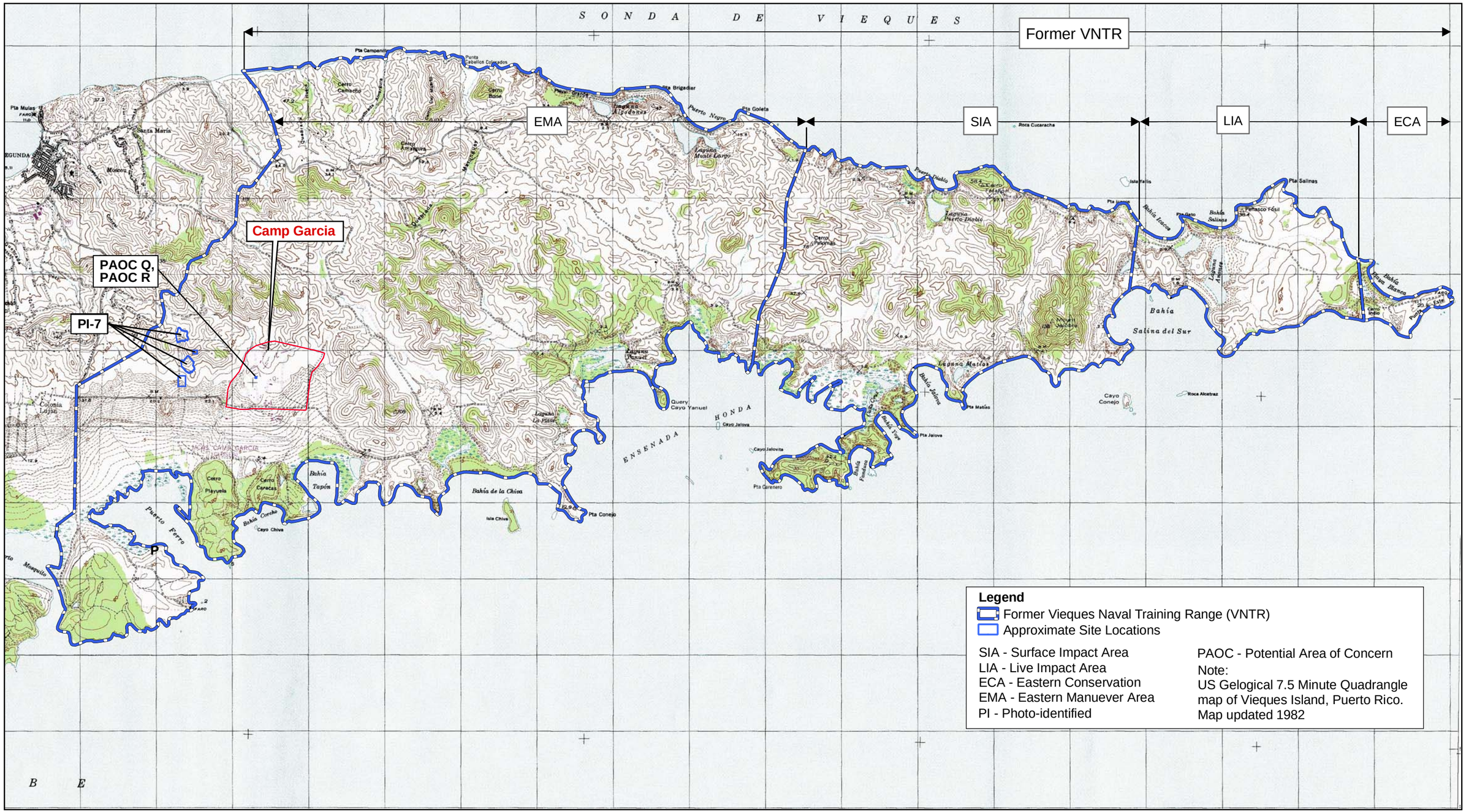

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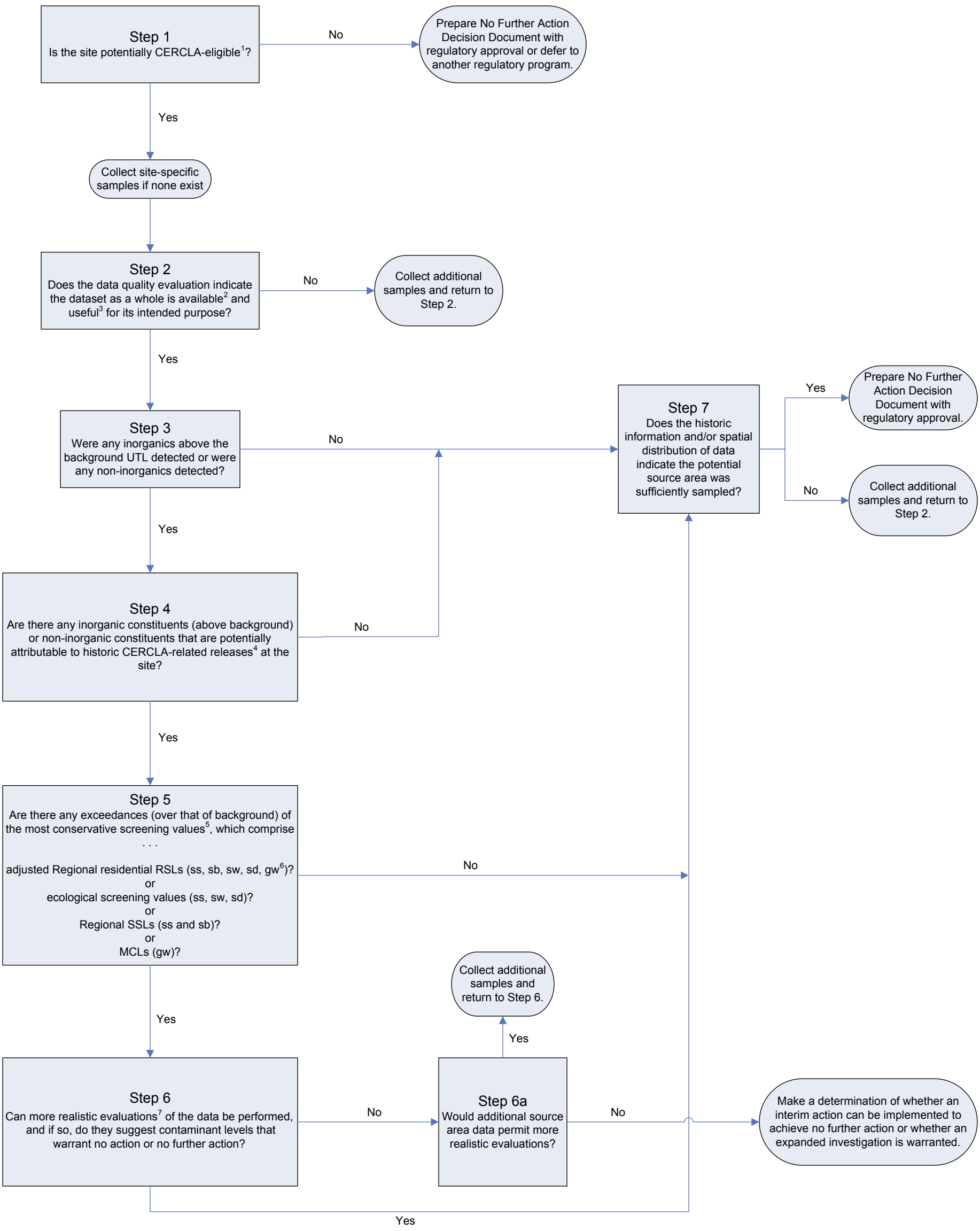
FIGURE ES-1
Former VNTR Site Location Map
Site Inspection/Expanded Site Inspection Report Addendum,
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico



Notes:
The decision makers associated with this decision tree are the Navy, USEPA, PREQB, and USFWS.

[1] Determination of CERCLA eligibility is described in Section 1 of the SI/ESI Report (August 2010)

[2] "Available" data are described in Section 1 of the SI/ESI Report (August 2010)

[3] "Useful" data are described in Section 1 of the SI/ESI Report (August 2010)

[4] CERCLA-related releases are defined in Section 1 of the SI/ESI Report (August 2010)

[5] For UST sites, PREQB Land Pollution Control Corrective Action Levels

[6] ss = surface soil; sb = subsurface soil; sw = surface water; sd = sediment; gw = groundwater

[7] Examples of the types of more realistic evaluations that may be performed are described in Section 1 of the SI/ESI Report (August 2010)

FIGURE ES-2
Data Evaluation Decision Tree
Site Inspection/Expanded Site Inspection Report Addendum, PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

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SECTION 1

Introduction

This report addendum summarizes the Supplemental Site Inspection/Expanded Site Inspection (SI/ESI) conducted in 2010 for three sites within the former Vieques Naval Training Range (VNTR). As applicable, the report also includes historical data from previous investigations for the purposes of holistic data evaluation and making site-specific determinations.

The three sites included in this addendum are:

- Photo-identified (PI) 7 – Former Quarry, Tar Drum Disposal Area, and Radar Communication Area, located in the former Eastern Maneuver Area (EMA)
- Potential Area of Concern (PAOC) Q – Former Boiler Room in Heat Plant Building 607, located in former Camp Garcia in the former EMA
- PAOC R – Former boiler house Building 617, located in former Camp Garcia in the former EMA

Supplemental investigations were performed at each of these sites because data presented in the SI/ESI Report indicated additional data were necessary in order to make site-specific determinations. The SI/ESI Report conclusions and recommendations for each site are (verbatim):

PI 7

"In general, the data collected throughout PI 7, coupled with the removal of the potential contaminant sources, suggest the site likely warrants no further action. Only one soil sample collected at the site indicates there may be PAH concentrations in a localized are that may pose potentially unacceptable human health risks. However, this sample was collected over 7 years ago, and several samples collected 3 years ago in the vicinity of the EBS sample did not contain the elevated PAH concentrations. Therefore, it is recommended that a co-located surface and subsurface soil sample be collected at the location of EBS sample PI7-3 and analyzed for PAHs to determine current condition concentrations.

If the PAH concentrations from the two new soil samples, replacing the PAH data for PI7-3 and considered with the other, nearby PAH concentrations, suggest the soil concentrations do not pose a potentially unacceptable risk to human receptors, no further investigation or action will be necessary for the site. If the PAH concentrations, considered with the other, nearby PAH concentrations, suggest the soil concentrations do pose a potentially unacceptable risk to human receptors, a limited soil removal will be done similar to that done in the area of the former drums and a confirmatory surface or co-located surface/subsurface soil sample (based on the PAH concentrations in the initial co-located surface/subsurface soil sample and depth of any soil removal) will be collected. It is proposed that this activity be done in accordance with the SI/ESI SAP (CH2M HILL, 2009)."

PAOC Q/R

"As shown in Table 21-4, the surface soil was not sufficiently characterized because the historical ground surface was not encountered during surface soil sampling. In addition, refusal was encountered at the PAOC R subsurface soil sampling location. Therefore, it is recommended that the soil cover placed over PAOC Q/R be removed and co-located surface and subsurface soil samples collected at the original planned locations."

In that the Supplemental ESI at PI 7 focused on the Former Quarry Area where soil sample PI7-3 was collected, as stated in the above recommendation, this addendum focuses evaluation of the data on that part of the site. However, the remaining parts of the site will be included in the evaluation presented in the decision document for the site.

Because this is an addendum to the SI/ESI Report, much of the information contained within the SI/ESI Report is applicable to the supplemental investigation discussed in this addendum. In these cases, the reader is referred to those sections of the SI/ESI Report rather than regurgitating the information herein. To that end, the reader is referred to Section 1 of the SI/ESI Report for a discussion of the objectives of the SI/ESI (which are applicable to the supplemental investigation); the decision analysis process by which the supplemental and applicable historical data are evaluated; historical activities; and physical and environmental characteristics of the former Vieques Naval Training Range (VNTR) and the three aforementioned sites. **Figure 1-1** shows the location of the three sites in relation to the former VNTR.

1.1 Organization of the SI/ESI Report Addendum

The SI/ESI Report Addendum is organized as follows:

- **Section 1, Introduction,** presents the conclusions and recommendations for the three sites included in the supplemental investigation, which provide the justification for the supplemental activities conducted and the associated data evaluation procedures.
- **Section 2, Investigation Methodology,** summarizes the Supplemental SI/ESI data collection activities.
- **Sections 3 through 5** summarize the decision analysis for each of the three PI/PAOC sites. Each section also includes the conclusions and recommendations for the particular site.
- **Section 6, Summary of Conclusions and Recommendations,** summarizes the conclusions and recommendations made for each site.
- **Section 7, References,** lists the documents used in preparation of this report.

Tables and figures are presented at the end of each section, as applicable.

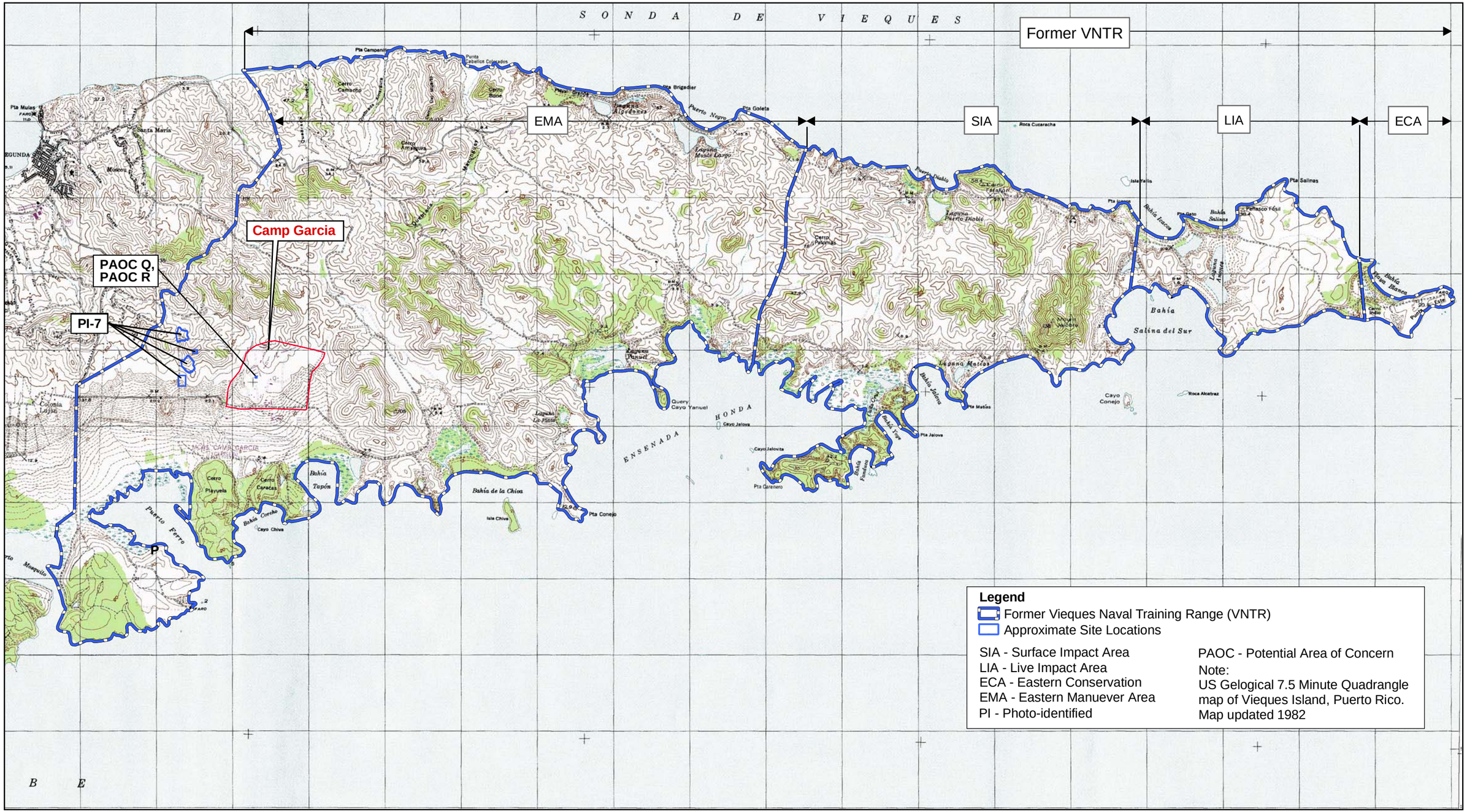

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FIGURE 1-1
Former VNTR Site Location Map
Site Inspection/Expanded Site Inspection Report Addendum,
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

SECTION 2

Investigation Methodology

This section summarizes the field investigation procedures of the Supplemental SI/ESI conducted for the three sites located within the Former VNTR during August 2010. Investigation activities included collection of surface and subsurface soil samples. The investigation methodology from the previous investigations can be found in the historical investigation reports.

The Supplemental SI/ESI investigation activities were conducted in accordance with the SI/ESI Sampling and Analysis Plan (SAP) entitled *Final Site Inspection/Expanded Site Inspection Sampling and Analysis Plan 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range Vieques, Puerto Rico* (CH2M HILL, 2009), the standard operating procedures (SOPs) presented in the Master Work Plan (MQAPP) titled *Master Quality Assurance Project Plan, Vieques, Puerto Rico* (CH2M HILL, 2007a), and the *Final Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2010).

Table 2-1 summarizes the soil samples collected, analyses performed, sample nomenclature, and depth of sampling.

2.1 Soil Sampling

Surface and subsurface soil samples were collected in general accordance with the SI/ESI SAP and the SOPs in the MQAPP. Table 2-1 summarizes the soil samples collected at each site during the Supplemental SI/ESI and includes an explanation for sample depth intervals that deviated from the normal protocol. For information regarding previously collected samples, refer to Table 2-1 in SI/ESI Report (CH2M HILL, 2010). Locations of soil samples collected during the investigation activities are included in site-specific sections 3 through 5.

Specific methods of supplemental sampling for each location are summarized in the soil boring logs included in Appendix A. Soil samples at each of the three sites were collected using a slide hammer.

Following soil sample collection SOPs at sites PAOC Q and PAOC R, VOC samples were collected by pushing the En Core™ sampler into the soil in the spoon sample several times to fill the sampler with soil from the target interval. After the VOC sample was collected, the remainder of the soil was transferred to a stainless steel bowl, homogenized with a stainless steel spoon, and soil for other parameters was then transferred into the appropriate sample containers.

At site PI 7, surface and subsurface SVOC samples were collected from the spoon sample at target intervals in accordance with SOPs. The soil was field composited and homogenized in a stainless steel bowl. Subsurface soil was collected from the interval 1 to 1.5 feet bgs, because refusal was reached at 1.5 feet bgs (in accordance with the protocol).

2.2 Surveying

Both Real-Time Kinematic (RTK) global positioning system (GPS) and hand held GPS techniques were used by CH2M HILL to record sample locations for each of the sites. These locations included surface soil samples and subsurface soil samples. The RTK GPS method has a horizontal and vertical accuracy of ±0.03 foot. All survey data for sampling locations for each site are located in Table 2-2.

2.3 Decontamination and Waste Management

Decontamination and waste management procedures followed applicable SOPs. Disposable acetate liners were used during soil sample collection activities at sites PI 7, PAOC Q, and PAOC R.

2.4 Laboratory and Field Sampling Protocol

Surface soil and subsurface soil samples collected for analyses were placed on ice and shipped via overnight courier. Density and grain size samples were analyzed by TestAmerica in Burlington, Vermont. All other environmental samples were analyzed by Katahdin Analytical Services, Inc. of Scarborough, Maine. Both contracted laboratories fulfilled the requirements of the U.S. Navy's QA/QC Program Manual and followed procedures outlined in the SAP (CH2M HILL, 2009).

2.5 Sample Analysis and Quality Assurance/Quality Control

Samples were analyzed for constituents shown in Table 2-1. All analytical tests were conducted in accordance with the appropriate analytical methods described in the Data Quality Evaluation Reports (Appendix C). The number and frequency of the quality assurance/quality control (QA/QC) samples are also presented in the Data Quality Evaluation Reports. All raw laboratory data are included in Appendix B. Tables of detected constituents and screening value exceedances are included in the site-specific sections (i.e., Sections 3 through 5).

2.6 Data Validation and Evaluation

Analytical results were validated by an independent, third-party data validator. Data validation was performed in accordance with:

- USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review; EPA 540/R-99/008; October, 1999 (EPA, 1999)
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; EPA 540-R-04-004; October, 2004 (EPA, 2004)
- Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B (Rev 3, Oct 2006); SOP NO. HW-24 (EPA, 2006a)
- Validating Semivolatile Compounds by SW-846 Method 8270 (Rev. 3, October 2006); SOP HW-22 (EPA, 2006b)

- Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3 (SOP Revision 13); (Revision 13, September, 2006). (EPA, 2006c)

Typical areas of review (as applicable to each individual method) included holding time compliance, calibration verification, blank results, matrix spike precision and accuracy, accuracy as demonstrated by laboratory control samples (LCSs), field duplicate results, surrogate recoveries, internal standard performance, and interference checks. Region II SOPs for data validation, as referenced above, include data review worksheets, which were completed for each applicable method. Any non-conformance was documented and qualifiers were applied to the data if necessary. This data review and validation process is independent of the laboratory's checks and focuses on the usability of the data to support the project data interpretation and decision-making processes.

The validation of data was done as described by Worksheet 35 of the UFP-SAP (CH2M HILL, 2009). The data validation reports are provided in Appendix D. The data quality evaluation, which focuses on the impact of QA/QC exceedances on the data availability and usability, is included in Appendix C.

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Table 2-1
Site Sample Summary
7 Consent Order Sites and 16 PI/PAOC Sites
Site Inspection/Expanded Site Inspection Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Site	Investigation	Media Samples	Analytes	Sample Identification	Soil Sample Depth (ft bls)
PI 7 (Central Subsection - Former Quarry)	2010 Supplemental ESI	1 SS	SVOCs	PI07-SS42-0001-0810	0 - 1
		1 SB	SVOCs	PI07-SB42-0101H-0810, PI07-SB42P-0101H-0810	1 - 1.5. Sample depth due to refusal at 1.5'
PAOC Q	2010 Supplemental SI	1 SS	TCL VOCs, SVOCs, TAL Metals, Cyanide, pH, TOC, Density, Grain Size	VEPQ/R-SS01-0405-0810	4 - 5. Sample depth a result of removal of gravel/fill layer before sampling. Sampling depth equivalent to 0 - 1' bls at original site elevation.
		1 SB	TCL VOCs, SVOCs, TAL Metals, Cyanide, pH, TOC, Density, Grain Size	VEPQ/R-SB01-0810-0810	8 - 10. Sample depth a result of removal of gravel/fill layer before sampling. Sampling depth equivalent to 4 - 6' bls at original site elevation.
PAOC R	2010 Supplemental SI	1 SS	TCL VOCs, SVOCs, TAL Metals, Cyanide, pH, TOC, Density, Grain Size	VEPQ/R-SS02-0304-0810	3 - 4. Sample depth a result of removal of gravel/fill layer before sampling. Sampling depth equivalent to 0 - 1' bls at original site elevation.
		1 SB	TCL VOCs, SVOCs, TAL Metals, Cyanide, pH, TOC, Density, Grain Size	VEPQ/R-SB02-0709-0810, VEPQ/R-SB02P-0709-0810	7 - 9. Sample depth a result of removal of gravel/fill layer before sampling. Sampling depth equivalent to 4 - 6' bls at original site elevation.

Notes:
[1] SS = surface soil; SO = soil boring location or composite soil sample; SB = subsurface soil; GW = groundwater; WW = water

Table 2-2
Survey Data
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Site ID	Station ID	Sample ID	(UTM NAD 83 20Q)	
			Northing	Easting
PI-7				
	VEP7-SO42	PI07-SS42-0001-0810	2005623.69	243473.42
	VEP7-SO42	PI07-SB42-0101H-0810	2005623.69	243473.42
		PI07-SB42P-0101H-0810	2005623.69	243473.42
PAOC Q				
	VEPQ/R-SO01	VEPQ/R-SS01-0405-0810	2005552.9016	244374.6962
	VEPQ/R-SO01	VEPQ/R-SB01-0810-0810	2005552.9016	244374.6962
PAOC R				
	VEPQ/R-SO02	VEPQ/R-SS02-0304-0810	2005636.3075	244341.2777
	VEPQ/R-SO02	VEPQ/R-SB02-0709-0810	2005636.3075	244341.2777
		VEPQ/R-SB02P-0709-0810		

SECTION 3

PI 7 - Former Quarry, Tar Drum Disposal Area, and Radar Communication Area

This section presents the results of the Supplemental SI/ESI Sampling performed at PI 7. PI 7 is located approximately ¼-mile west of the western boundary of Camp Garcia (**Figure 1-1**). As discussed in Section 12 of the Final SI/ESI Report (CH2M HILL, 2010), the data from the tar drum disposal area and radar communication area suggested those areas warrant no further action or investigation. In fact, it was only the detected concentrations of several polycyclic aromatic hydrocarbons (PAHs) in one historical sample, collected within the former quarry area during the 2002 Environmental Baseline Survey (EBS), that suggested the soil in that area may pose a potentially unacceptable human health risk. However, it was noted that the sample data were more than 7 years old and that other samples in the same general vicinity did not contain elevated PAHs. Therefore, the location of the historical sample with elevated PAH concentrations was re-sampled to determine current conditions and associated potential risks. Given the above objective, and that this report is an addendum to the SI/ESI Report, the remainder of this section focuses on the area of PI 7 that was re-sampled. For information regarding the northern (former radar communication area) and southern (former tar drum disposal area) areas, see Section 12 of the Final SI/ESI Report (CH2M HILL, 2010).

3.1 Conceptual Site Model

The CSM for PI 7 is based on review of historical information such as records, aerial photographs, interviews, site inspection documentation, as well as site-specific data, and is presented in Section 12.1 of the Final SI/ESI Report (CH2M HILL, 2010). Since the objective of the supplemental sampling at PI 7 was to re-sample an existing location, the CSM presented in the SI/ESI Report is still applicable and, therefore, is not repeated here. The reader is instead referred to Section 12.1 of the Final SI/ESI Report.

3.2 Sampling Approach and Chemical Constituents Identified

As previously mentioned, the Supplemental SI/ESI was concerned with the re-sampling of only one location within the central subsection (former quarry) of PI 7 (i.e., sample location PI7-3). Therefore, this section evaluates and discusses the new SVOC data from location PI7-3 (i.e., SS/SB42), historical non-SVOC data from sample PI7-3, and data from samples collected near location PI7-3 (i.e., PI7-1, PI7-2, PI7-4, SS/SB11, SS12, SS13, SS/SB14, SS/SB21, and SS/SB40). As stated in Section 12.4 of the Final SI/ESI Report (CH2M HILL, 2010), SVOC data from sample PI7-3 is excluded from the current evaluation because more current data from the same location now exist.

EBS Soil Sampling

Four surface soil samples were collected within the former quarry area during the EBS (2002) (NAVFACENGCOM, 2003) in the vicinity of surficial debris (PI7-1 through PI7-4 in

Figure 3-1) and analyzed for Appendix IX VOCs, SVOCs, pesticides, herbicides, PCBs, inorganics; and explosives, including perchlorate. Surface soil sample locations were chosen because they were at the base of the slope near the edge of the site (as it was delineated in 2002).

PA/SI Soil Sampling

During the PA/SI (2006), two co-located surface soil and subsurface soil samples (and two additional surface soil samples) were collected within the former quarry near the PI7-3 sample location (i.e., SS/SB11, SS12, SS13, and SS/SB14 in **Figure 3-1**). Two additional subsurface samples (SB12 and SB13) were planned, but bedrock was encountered in these two borings at 1 ft bgs. A co-located surface and subsurface soil sample was collected adjacent to the individual empty drum identified near the southern boundary of the former quarry (i.e., SS/SB21 in **Figure 3-1**). All samples were analyzed for TCL VOCs, SVOCs, pesticides, and PCBs; and TAL inorganics.

ESI Soil Sampling

During the ESI, the individual drum near the southern boundary of the former quarry was removed and a confirmatory surface soil sample was collected from the 6-inch interval immediately beneath the drum (i.e., SS40 in **Figure 3-1**) in accordance with the confirmatory sample collection criteria detailed in the SI/ESI SAP (CH2M HILL, 2009). A subsurface soil sample (i.e., SB40 in **Figure 3-1**) was also collected at this location from 0.5 to 1.5 ft bgs due to encountering refusal at 1.5 ft bgs. The sample depth interval for SB40 spanned both the surface and subsurface soil depths identified in the Master Plan (CH2M HILL, 2007a). As a conservative approach, sample SB40 is included in the Supplemental SI/ESI screening tables (Tables 3-1 and 3-2) for both surface and subsurface soil.

Both ESI soil samples were analyzed for TCL VOCs and SVOCs, and TAL inorganics.

Supplemental SI/ESI Soil Sampling

During the Supplemental SI/ESI in 2010, one co-located surface and subsurface soil sample was collected using a slide hammer at the location of former sample PI7-3 (i.e., SS/SB42 in **Figure 3-1**). The surface soil sample was collected from 0 to 1 ft bgs. Refusal was reached at 1.5 ft bgs; therefore, the subsurface soil interval was from 1 to 1.5 ft bgs. See Appendix A for the site-specific boring log. Both samples were analyzed for select SVOCs because PAHs were the only contaminants of potential concern identified in the SI/ESI Report as potentially contributing to unacceptable human health risk at this location. This sampling protocol was in accordance with the Final SI/ESI Report (CH2M HILL, 2010).

Tables 3-1 and 3-2 summarize the constituents detected in PI 7 surface and subsurface soil from sample locations at and near PI7-3 collected during the EBS (2002), PA/SI (2006), ESI (2009), and Supplemental SI/ESI (2010). The tables also identify screening criteria exceedances.

Raw analytical data for the EBS (2002) samples are provided in Appendix F of the Environmental Baseline Survey Report (NAVFACENGCOM, 2003). Raw analytical data for PA/SI (2006) samples are provided in Appendix O of the Final PA/SI Report (CH2M HILL, 2008). Raw analytical data for the ESI (2009) samples are provided in Appendix K of the

Final SI/ESI Report (CH2M HILL, 2010). Raw analytical data for the Supplemental SI/ESI (2010) samples are provided in Appendix B of this SI/ESI Report Addendum.

3.3 PI 7 Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Decision Tree (**Figure 3-2**) with reference to the detection tables (Tables 3-1 and 3-2) for samples collected at and near former sample location PI7-3. For a discussion of the data collected elsewhere at PI 7 during previous investigations, please refer to Sections 12.3 and 12.4 of the Final SI/ESI Report (CH2M HILL, 2010).

Step 1: Is the site potentially CERCLA-eligible?

CERCLA eligibility was established for PI 7 in Section 12.3 of the Final SI/ESI Report (CH2 M HILL, 2010). For PI 7 it was concluded that the potential for the presence of CERCLA hazardous substances could not be confidently ruled out without sample collection, which was conducted during the 2002 EBS, the 2006 SI, the 2009 ESI, and the 2010 Supplemental SI/ESI. Therefore, the decision analysis proceeds to Step 2. Further, it is noted that the remainder of the decision analysis mirrors that presented in the Final SI/ESI Report with the following exceptions:

a. Screening values have been updated, as necessary, to reflect the most current available

b. The SVOC data for PI7-3 have been replaced with the SVOC data for SS/SB42.

Step 2: Does the data quality evaluation indicate the dataset as a whole is available and useful for the intended purpose?

EBS (2002)

Although EBS data were not subject to third-party validation, the data still underwent some validation processes. The results of laboratory QA/QC samples were compared to limits specified by the analytical methodology and/or laboratory SOPs. At a minimum, these QA/QC samples included blanks, calibrations, and MS/MSDs. No QA/QC exceedances were noted. These historical data are available for use as reported.

PA/SI (2006)

Appendix N, Section N.15 of the Final PA/SI Report (CH2M HILL 2008) discusses the evaluation of the PI 7 data quality. As detailed in Section N.15, the PI 7 data are acceptable for use in evaluating whether a release of hazardous waste or hazardous constituents warranting further action occurred at PI 7.

ESI (2009)

Based on the data quality evaluation of the SI/ESI analytical data, 99 percent of the data are usable for the intended purpose. The site-specific data set achieved the 95 percent project completeness goal (as defined in the UFP-SAP) for each site. Further details of the data quality evaluation are provided in Appendix M of the Final SI/ESI Report (CH2M HILL, 2010).

Supplemental SI/ESI (2010)

Appendix C presents the data quality evaluation of the Supplemental ESI analytical data for PI 7. Based on this evaluation of the Supplemental ESI data, 100 percent of the data are acceptable for use. Additionally, the site-specific data set exceeded the 95 percent project completeness goal, achieving 100 percent completeness.

Step 3: Were any inorganics above the background UTL detected or were any non-inorganics detected?

For the samples collected in the vicinity of PI7-3 (PI7-1, PI7-2, PI7-4, SS/SB11, SS12, SS13, SS/SB14, SS/SB21, SS/SB40, and SS/SB42) during the EBS (2002), the PA/SI (2006), the ESI (2009), and the Supplemental SI/ESI (2010), the following inorganics above the background UTLs and non-inorganics were detected by location, sampling event, and by medium:

EBS (2002) Surface Soil (samples PI7-1, PI7-2, PI7-3 [excluding SVOCs], and PI7-4)

- VOCs: None detected
- SVOCs: None detected
- Pesticides: None detected
- Herbicides: None detected
- PCBs: None detected
- Inorganics above background UTLs: Arsenic, Thallium
- TPH GRO: None detected
- TPH DRO: None detected

PA/SI (2006) Surface Soil (samples SS11 through SS14, and SS21)

- VOCs: None detected
- SVOCs: None detected
- Pesticides: 4,4′-DDE
- PCBs: None detected
- Inorganics above background UTLs: Barium, Copper, Magnesium, Selenium, Zinc

PA/SI (2006) Subsurface Soil (samples SB11, SB14, and SB21)

- VOCs: None detected
- SVOCs: Bis(2-ethylhexyl)phthalate
- Pesticides: None detected
- PCBs: None detected
- Inorganics above background UTLs: Barium, Calcium, Magnesium, Selenium, Zinc

ESI (2009) Surface Soil (SS/SB40)

- VOCs: None detected
- SVOCs: Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Carbazole, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, PAH LMW, PAH HMW, Pentachlorophenol, Pyrene
- Inorganics above background UTLs: Barium, Magnesium

ESI (2009) Subsurface Soil (SB40)

- VOCs: None detected
- SVOCs: Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Pyrene
- Inorganics above background UTLs: Barium, Magnesium

Supplemental SI/ESI (2010) Surface Soil (SS42)

- SVOCs: None detected

Supplemental SI/ESI (2010) Subsurface Soil (SB42)

- SVOCs: None detected

Step 4: Are there any inorganic constituents above background or non-inorganic constituents that are potentially attributable to historic CERCLA-related releases at the site?

A drum was found within the former quarry just south of the area of sample location PI7-3. Some other debris was found in this area as well. As such, it is possible that the SVOCs and inorganics detected in the soil near sample location PI7-3 are attributable to historic CERCLA-related releases.

The pesticide detected in the PI 7 soil is the same pesticide and of similar concentration detected at other sites across east Vieques (see Tables O-1 in the Final SI/ESI Report, CH2M HILL 2010). 4,4'-DDE was detected in one PI 7 surface soil sample in the vicinity of sample location PI7-3 at a concentration of 0.90 µg/kg, which is toward the low end of the concentrations detected at other sites across east Vieques (i.e., 0.08 µg/kg to 1,200 µg/kg). This information, coupled with the history of the site, suggests the pesticide is present due to normal pesticide use, not a CERCLA-related release (see Appendix O and *Pesticides and Herbicides* under Section 1.1.1 of the Final SI/ESI Report (CH2M HILL 2010)). Therefore, pesticides are not considered further in the decision analysis process.

In addition, the thallium concentrations reported for samples collected during the EBS utilized a method that, although standard at the time, tended to provide falsely elevated results (see Section 1 of the Final SI/ESI Report (CH2M HILL 2010)). Table 13-1 from the Final SI/ESI Report (CH2M HILL 2010) (PI 8) shows that no thallium was detected in the 10 surface soil samples collected during the SI, including the two samples immediately adjacent to samples where thallium concentrations of approximately 1 mg/kg were detected

during the EBS. Therefore, the thallium results from the EBS samples are not considered further in the decision analysis process for PI 7.

Step 5: Are there any exceedances (over that of background) of the most conservative screening values?

In this step of the decision analysis, the data for the CERCLA-related constituents identified in Step 4 are compared to the screening criteria described in Section 1 of the Final SI/ESI Report (CH2M HILL, 2010) and shown on the detection tables. Those constituents that exceed one or more criteria (and background for inorganics) are listed below by location, sampling event, and by medium.

EBS (2002) Surface Soil (samples PI7-1, PI7-2, PI7-3 [excluding SVOCs], and PI7-4)

- Arsenic: one detection (sample PI7-3) at a concentration (12 mg/kg) above the RSL (0.39 mg/kg), the SSL at a DAF of 1 (0.29 mg/kg), and the background UTL (1.6 mg/kg)

PA/SI (2006) Surface Soil (samples SS11 through SS14, and SS21)

- Barium: one detection (sample SS21) at a concentration (200 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and the background UTL (147 mg/kg)
- Copper: one detection (sample SS13) at a concentration (83 mg/kg) above the ecological screening value (70 mg/kg), the SSL at a DAF of 1 (46 mg/kg), and the background UTL (66 mg/kg)
- Selenium: one detection (sample SS11) at a concentration (0.56 mg/kg) above the ecological screening value (0.52 mg/kg), the SSL at a DAF of 1 (0.26 mg/kg) and the background UTL (0.51 mg/kg); one detection (sample SS21) at a concentration (0.60 mg/kg) above the ecological screening value (0.52 mg/kg), the SSL at a DAF of 1 (0.26 mg/kg) and the background UTL (0.51 mg/kg)

PA/SI (2006) Subsurface Soil (samples SB11, SB14, and SB21)

- Barium: one detection (sample SB21) at a concentration (181 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and the background UTL (147 mg/kg)
- Selenium: one detection (sample SB14) at a concentration (0.72 mg/kg) above the SSL at DAF of 1 (0.26 mg/kg) and the background UTL (0.51 mg/kg)

ESI (2009) Surface Soil (SS/SB40)

- Benzo(a)anthracene: one detection (sample SS40) at a concentration (78 µg/kg) above the SSL at a DAF of 1 (10 µg/kg)
- Benzo(a)pyrene: one detection (sample SS40) at a concentration (180 µg/kg) above the RSL (15 µg/kg); one detection (sample SB40) at a concentration (18 µg/kg) above the RSL (15 µg/kg)
- Benzo(b)fluoranthene: one detection (sample SS40) at a concentration (340 µg/kg) above the RSL (150 µg/kg) and SSL at a DAF of 1 (35 µg/kg); one detection (sample SB40) at a concentration (36 µg/kg) above the SSL at a DAF of 1 (35 µg/kg)

- Dibenza(a,h)anthracene: one detection (sample SS40) at a concentration (57 µg/kg) above the above the RSL (15 µg/kg) and SSL at a DAF of 1 (11 µg/kg)
- Indeno(1,2,3-cd)pyrene: one detection (sample SS40) at a concentration (210 µg/kg) above the RSL (150 µg/kg) and the SSL at a DAF of 1 (120 µg/kg)
- Pentachlorophenol: one detection (sample SS40) at a concentration (34 µg/kg) above the SSL at a DAF of 1 (10 µg/kg)
- Barium: one detection (sample SS40) at a concentration (185 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and the background UTL (147 mg/kg); one detection (sample SB40) at a concentration (172 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and the background UTL (147 mg/kg)

ESI (2009) Subsurface Soil (SB40)

- Benzo(a)pyrene: one detection (sample SB40) at a concentration (18 µg/kg) above the RSL (15 µg/kg)
- Benzo(b)fluoranthene: one detection (sample SB40) at a concentration (36 µg/kg) above the SSL at a DAF of 1 (35 µg/kg)
- Barium: one detection (sample SB40) at a concentration (172 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and the background UTL (147 mg/kg)

As shown above, there are exceedances of the most conservative screening values. Therefore, the decision analysis process continues to Step 6.

Step 6: Can more realistic evaluations of the data be performed, and if so, do they suggest contaminant levels warrant no further investigation or action?

Human Health Evaluation

As a conservative approach, risk estimates were prepared for a future residential scenario at the area of the historic elevated PAHs in the former quarry area of PI 7 under investigation. Newly-collected soil SVOC data for SS/SB 42 were used in the evaluation, together with historical data from other nearby samples (excluding SVOC data for PI7-3). The area surrounding former sample PI7-3 is approximately 0.75 acre in size, which is the approximate size of a residential lot. No chemicals in soil were detected above background (for inorganics) and adjusted RSLs at concentrations exceeding 100 times the screening levels (see Table 3-3). Therefore, no hot spots were identified and all soil data were merged in the residential evaluation.

Arsenic and four PAHs were detected in surface or total soil (0-6 ft bgs) above human health screening levels and background level (arsenic only) (see Table 3-3).

- Arsenic was detected in 1 of 10 surface soil samples and 1 of 14 total soil samples above its RSL (0.39 mg/kg). Based on the detected concentration (12 mg/kg), the ELCR is 3 x 10^{-5} and the non-cancer hazard quotient (HQ) is 0.5, which are within EPA's acceptable levels and arsenic would not be identified as a risk driver.
- Benzo(a)pyrene (B(a)P) was detected in 1 of 10 surface soil samples and 2 of 15 total soil samples above its RSL (15 µg/kg). Based on the maximum detected concentration (180

μg/kg), the ELCR is 1 x 10^{-5}, which is within EPA's acceptable range, and B(a)P would not be identified as a risk driver.

- Benzo(b)fluoranthene (B(b)F) was detected in 1 of 10 surface soil samples and 1 of 15 total soil samples above its RSL (150 μg/kg). Based on the maximum detected concentration (340 μg/kg), the ELCR is 2 x 10^{-6}, which is within EPA's acceptable range, and B(b)F would not be identified as a risk driver.
- Dibenz(a,h)anthracene (D(a,h)A) was detected in 1 of 10 surface soil samples and 1 of 15 total soil samples above its RSL (15 μg/kg). Based on the maximum detected concentration (57 μg/kg), the ELCR is 4 x 10^{-6}, which is within EPA's acceptable range, and D(a,h)A would not be identified as a risk driver.
- Indeno(1,2,3-cd)pyrene (I[123-cd]P) was detected in 1 of 10 surface soil samples and 1 of 15 total soil samples above its RSL (150 μg/kg). Based on the maximum detected concentration (210 μg/kg), the ELCR is 1 x 10^{-6}, which is within the EPA acceptable range, and I(123-cd)P would not be identified as a risk driver.

Six additional constituents (aluminum, chromium, cobalt, iron, manganese, and vanadium) were detected in surface or total soil above adjusted human health screening levels but below background UTLs. Based on the historical source of potential releases identified at the site (see Section 12.1 of the Final SI/ESI Report (CH2M HILL, 2010)) and the environmental conditions on Vieques (see Appendix R in the Final SI/ESI (CH2M HILL 2010)), the form of chromium expected to be present at the site is Cr^{3+}, especially considering its detected concentrations are within background levels. Based on maximum detected concentrations of arsenic, the four PAHs, and the six additional constituents, the cumulative ELCR is 5 x 10^{-5} and the maximum target organ-specific HI is 0.7 (see Table 3-3); the cumulative ELCR and HI are within EPA's acceptable levels. Consequently, there is not a concern for potential cumulative effects from multiple PAHs and metals in the former quarry area of the site.

Ecological Evaluation

Two metals (copper and selenium) exceeded ecological soil screening values and background in at least one of the 10 surface soil samples (0 to 6 or 0 to 12 inches) collected in the vicinity of former sample PI7-3. The ecological risk assessment screening statistics for these metals can be found on Table 3-4. Carbazole was also detected but lacked a soil screening value. None of these constituents poses an unacceptable risk to ecological receptors based upon the following:

- The portion of the site evaluated, constituting the area surrounding former sample PI7-3, is entirely forested and may provide suitable habitat for avian receptors such as the pearly-eyed thrasher. However, this portion of the site is only about 0.5 acre in size. While the size of this area is slightly larger than the core home range for an individual pearly-eyed thrasher during some portions of the nesting season, it is well below the size needed to support a breeding population of this species; populations, not individuals, are the focus of the assessment endpoints for these types of receptors. Further, the habitat quality in this portion of the site is generally uniform. Thus, the chances that an individual thrasher would have its entire core home range located within the area evaluated is small. More likely, only a small portion of its core home range would overlap the area evaluated and a portion of its foraging would also be expected to occur

outside of the core area. Thus, exposures to upper trophic level receptors such as the pearly-eyed thrasher are not considered significant enough to warrant inclusion in the ecological evaluation.

- Copper exceeded the ecological screening value (70 mg/kg) and background UTL (66 mg/kg) in 1 of 9 surface soil samples (it was not analyzed for in the tenth sample). The maximum HQ was 1.18. However, the mean copper concentration (48.9 mg/kg) was less than the ecological screening value (HQ of 0.70).
- Selenium, which was detected in 3 of 9 surface soil samples (it was not analyzed for in the tenth sample), exceeded the ecological screening value (0.52 mg/kg) in 2 of the 9 samples at a maximum HQ of 1.15. The mean HQ (1.48) also exceeded 1, and is higher than the maximum HQ because half the reporting limits for non-detected constituents were used, including ones where the non-detect reporting limits exceeded the screening value (i.e., 3.6 and 3.8 mg/kg, where values of 1.8 and 1.9 mg/kg, constituting one-half of the sample reporting limit, were when calculating the mean). The other four non-detect samples had non-detect values (i.e., one-half of the sample reporting limit) that were less than the ecological screening value. Although the background UTL for selenium in this soil type is 0.51 mg/kg, selenium concentrations up to 1.3 mg/kg were detected during the East Vieques background soil inorganics investigation in nearby soil types (CH2M HILL 2007). This suggests that the selenium concentrations detected in this portion of PI7 (maximum of 0.60 mg/kg) may be within the range of background. Further, the screening value (0.52 mg/kg) is based upon potential impacts to plants. The site is heavily vegetated, with no apparent impacts to the terrestrial plant community. Maximum concentrations (and maximum reporting limits for non-detect samples) are less than soil screening values based upon other receptors (e.g., 4.10 mg/kg for soil invertebrates).
- Carbazole was detected in one surface soil samples at a maximum concentration of 4 μg/kg (0.004 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In studies with oligochaete worms exposed to carbazole-spiked soils, the resulting Lethal Concentration to 50 percent of the population (LC_{50}) and Effect Concentration to 50 percent of the population (EC_{50}) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). The maximum concentration of carbazole is well below these effect concentrations.

Additional Comparisons

When evaluating the potential for contaminant migration from soils to groundwater, the use of EPA generic soil screening levels (SSLs), applying a dilution attenuation factor (DAF) of 1, were used as the most conservative approach. However, as a general rule, DAF values from 1 to 20* can be applied dependent upon site-specific data (e.g., size of site, depth to groundwater, etc.). In addition, in the absence of groundwater data, other information such as that listed below was used, as applicable, to evaluate the potential for groundwater impacts from soil contamination:

- depth of contamination with respect to estimated groundwater depth
- mobility of contaminant
- number of exceedances

*SSLs for DAF values of 1 and 20 are provided in Table 1 of Appendix A of the EPA Generic SSL guidance (EPA 2002). Estimated SSLs for DAF values in between 1 and 20 were used in this evaluation.

None of the PAHs that exceed the SSLs at a DAF of 1 in surface and subsurface soil near sample location PI7-3 were detected in the groundwater samples collected downgradient of this area. In fact, no SVOCs were detected in the downgradient wells (i.e., wells MW-01 and MW-02 located in the former tar drum disposal area at PI 7 [see Table 12-3 of the SI/ESI Report]). This suggests the SSLs at a DAF of 1 are not realistic predictors of PAH leaching to groundwater.

Four constituents (arsenic, barium, copper, and selenium) were detected in surface and/or subsurface soil above their SSLs at a DAF of 1 and background UTLs. However, arsenic and copper were not detected in groundwater downgradient of this area and none of the barium or selenium concentrations exceeded its respective tap water RSL or MCL. This suggests the SSLs at a DAF of 1 are not realistic predictors of metals leaching to groundwater.

Step 7: Does the historic information and/or spatial distribution of data indicate the potential source area was sufficiently sampled?

The historical information (aerial photographs, interviews, site inspections), as well as sampling activities, indicate the most likely sources of CERCLA-related releases in the vicinity of PI7-3 have been sufficiently characterized. Multiple soil samples have been collected near sample location PI7-3, including confirmatory soil samples from beneath the drum that was removed in the area. Further, the newly collected SVOC data (i.e., non-detect) also suggest that the historical SVOC data for sample PI7-3 are not representative of current conditions, either due to time since the EBS samples were collected or the indication that PI7-3 was collected adjacent to a rubber hose.

3.4 Conclusions and Recommendations

Table 3-5 summarizes the results of the decision analysis for the area of PI 7 under investigation during the supplemental ESI sampling.

The supplemental ESI sample (SS/SB42) showed no PAH detections, which was the only reason additional samples were warranted at the site. Therefore, based on the updated evaluation of the data in that area of the former quarry, the current conditions do not pose a potentially unacceptable risk to human or ecological receptors or leaching concern for groundwater and no further investigation or action will be necessary for the site; a no further action decision document will be prepared for the site that includes data from all areas of PI 7, including data screening and evaluation based on current regulatory screening values.

Table 3-1
Surface Soil Detection and Exceedance Results
PI 7
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	Background UTL (KTd)	Adjusted RSL for Residential Soil	Eco (E)	SSL (DAF=1)	VNTR-PI7-1	VNTR-PI7-2	VNTR-PI7-3	VNTR-PI7-4	EPI07-SO11	EPI07-SO12	EPI07-SO13	EPI07-SO14	EPI07-SO21	VEP7-SO40			SO42
Sample ID					VNTR-PI7-1	VNTR-PI7-2	VNTR-PI7-3	VNTR-PI7-4	EPI07-SS11-0001	EPI07-SS12-0001	EPI07-SS13-0001	EPI07-SS14-0001	EPI07-SS21-0001	VEP7-SS40-0H-0509	VEP7-SB40-H1H-0509	VEP7-SB40P-H1H-0509	PI07-SS42-0001-0810
Sample Date					12/16/02	12/16/02	12/16/02	12/16/02	03/14/06	03/14/06	03/14/06	03/14/06	03/16/06	05/01/09	05/01/09	05/01/09	08/17/10
Chemical Name																	
Volatile Organic Compounds (UG/KG)																	
No Detections	--	--	--	--	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	NA
Semivolatile Organic Compounds (UG/KG)																	
Acenaphthylene	--	340,000	--	22,000	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	17 J	21 UJ	2.0 J	12 U
Anthracene	--	1,700,000	--	360,000	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	18 J	1.0 J	2.0 J	12 U
Benzo(a)anthracene	--	150	--	10	333 U	329 U	*	333 U	340 U	340 U	340 U	350 U	350 U	**78 J**	4.0 J	5.0 J	12 U
Benzo(a)pyrene	--	15	--	240	333 U	330 U	*	333 U	340 U	340 U	340 U	350 U	350 U	**180 J**	13 J	**18 J**	12 U
Benzo(b)fluoranthene	--	150	--	35	333 U	331 U	*	333 U	340 U	340 U	340 U	350 U	350 U	**340 J**	27 J	**36 J**	12 U
Benzo(g,h,i)perylene	--	170,000	--	120,000	333 U	332 U	*	333 U	340 U	340 U	340 U	350 U	350 U	240 J	19 J	26 J	12 U
Benzo(k)fluoranthene	--	1,500	--	350	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	170 J	17 J	24 J	12 U
Carbazole	--	--	--	--	NA	NA	*	NA	340 U	340 U	340 U	350 U	350 UJ	4.0 J	21 UJ	21 UJ	12 U
Chrysene	--	15,000	--	1,100	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	180 J	9.0 J	15 J	12 U
Dibenz(a,h)anthracene	--	15	--	11	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	**57 J**	21 UJ	7.0 J	12 U
Fluoranthene	--	230,000	--	160,000	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	73 J	5.0 J	5.0 J	12 U
Indeno(1,2,3-cd)pyrene	--	150	--	120	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 UJ	**210 J**	14 J	21 J	12 U
PAH HMW (Total)	--	--	18,000	--	0 U	0 U	*	0 U	0 U	0 U	0 U	0 U	0 U	1,530 J	NA	NA	0 U
PAH LMW (Total)		--	29,000	--	0 U	0 U	*	0 U	0 U	0 U	0 U	0 U	0 U	108 J	NA	NA	0 U
Pentachlorophenol	--	890	5,000	10	833 U	833 U	*	833 U	850 U	850 U	860 U	890 U	880 UJ	**34 J**	110 R	110 R	58 U
Pyrene	--	170,000	--	120,000	333 U	333 U	*	333 U	340 U	340 U	340 U	350 U	350 U	75 J	6.0 J	7.0 J	12 U
Herbicides (UG/KG)																	
No Detections	--	--	--	--	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)																	
4,4'-DDE	--	1,400	114	47	3.3 U	3.3 U	ND	3.3 U	0.90 J	3.4 U	3.4 U	3.5 U	3.5 U	NA	NA	NA	NA
Total Metals (MG/KG)																	
Aluminum	35,000	7,700	--	55,000	NA	NA	NA	NA	10,300	10,100	11,600	13,700	11,800	15,800	16,200	18,600	NA
Antimony	5.8	3.1	78	0.27	5.2 U	5.8 U	5.7 U	4.7 U	0.57 J	0.61 J	0.60 J	0.78 J	0.56 J	0.080 J	0.050 J	0.080 J	NA
Arsenic	1.6	0.39	18	0.29	0.86 U	0.96 U	**12**	0.78 U	1.0 U	1.0 U	1.0 U	1.1 U	1.1 U	0.50 U	0.36 U	0.47 U	NA
Barium	147	1,500	330	82	57	53	36	61	67	59	96	100	**200**	**185**	**156**	**172**	NA
Beryllium	0.27	16	40	3.2	0.43 U	0.48 U	0.47 U	0.39 U	0.51 U	0.51 U	0.51 U	0.54 U	0.53 U	0.25	0.24	0.22	NA
Calcium	8,840	--	--	--	NA	NA	NA	NA	5,500	7,210	4,600	5,960	3,600	3,690	3,280	3,630	NA
Chromium	72	0.29 [1]	64	0.00083 [1]	4.0	4.0	8.3	7.1	3.7	3.9	3.3	3.2	3.2 J	8.6	7.5	7.1	NA
Cobalt	16	2.3	13	0.49	7.0	6.9	5.6	6.9	11	11	9.9	12	9.5 J	9.4	8.0	8.6	NA
Copper	66	310	70	46	33	43	30	33	47	46	**83**	51	52	52	44	49	NA
Iron	38,100	5,500	--	640	NA	NA	NA	NA	16,700	17,100	14,500	18,700	16,800	27,800	23,600	26,000	NA
Lead	5.4	400	120	27	1.8	1.7	0.88	1.0	1.1	1.0 U	1.2	1.1	2.0	2.0	1.4 J	2.0 J	NA
Magnesium	3,710	--	--	--	NA	NA	NA	NA	**6,590**	**7,090**	**4,470**	**6,450**	**3,830 J**	**4,060**	**3,880**	**5,070**	NA
Manganese	1,630	180	220	57	NA	NA	NA	NA	535	554	481	623	717 J	748	543	580	NA
Mercury	0.057	0.78	0.10	0.57	0.077 U	0.059 U	0.087 U	0.065 U	0.10 U	0.10 U	0.10 U	0.11 U	0.11 U	0.020 J	0.028 U	0.032 U	NA
Nickel	22	150	38	48	3.5 U	3.9 U	3.8 U	4.9	3.2 J	4.1 U	4.1 U	4.3 U	2.6 J	3.3	3.2	3.4	NA
Potassium	5,270	--	--	--	NA	NA	NA	NA	831	574	514 U	779	1,460	1,600 J	840 J	950 J	NA
Selenium	0.51	39	0.52	0.26	0.86 U	0.96 U	0.94 U	0.78 U	**0.56 J**	0.51 J	3.6 U	3.8 U	**0.60 J**	0.50 U	0.36 UJ	0.47 UJ	NA
Sodium	1,590	--	--	--	NA	NA	NA	NA	508 U	513 U	514 U	540 U	532 U	136	169	191	NA
Thallium	0.13	--	1.0	0.14	**1.1**	**1.4**	0.94 U	**1.0**	0.51 U	0.51 U	0.51 U	0.54 U	0.53 U	0.10 U	0.072 U	0.094 U	NA
Vanadium	144	39	130	180	47	40	32	47	38	38	35	42	33	88	78	77	NA
Zinc	32	2,300	120	680	23	26	20	21	32	**33**	25	31	21	23	18	23	NA
Total Petroleum Hydrocarbons (MG/KG)																	
No Detections	--	--	--	--	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Exceeds Background UTL
Exceeds Background UTL and Adjusted RSL for Residential Soil
Exceeds Background UTL and SSL (DAF=1)
Exceeds Background UTL, Adjusted RSL for Residential Soil and SSL (DAF=1)
Exceeds Background UTL, ECO (E) and SSL (DAF=1)

NA - Not Analyzed
ND - Not Detected
-- Not part of background data set (where applicable) OR Regulatory standard not promulgated
* SVOC data has been substituted with the SVOC data from sample SO42
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - Not detected or not detected significantly greater than that in an associated blank.
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram
[1] The screening value for hexavalent chromium was used.

Table 3-2
Subsurface Soil Detection and Exceedance Results
PI 7
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	Background UTL (KTd)	Adjusted RSL for Residential Soil	SSL (DAF=1)	EPI07-SO11	EPI07-SO14	EPI07-SO21	VEP7-SO40		SO42	
Sample ID				EPI07-SB11-0102	EPI07-SB14-0406	EPI07-SB21-0103	VEP7-SB40-H1H-0509	VEP7-SB40P-H1H-0509	PI07-SB42-0101H-0810	PI07-SB42P-0101H-0810
Sample Date				03/14/06	03/14/06	03/16/06	05/01/09	05/01/09	08/17/10	08/17/10
Chemical Name										
Volatile Organic Compounds (UG/KG)										
No Detections	--	--	--	NA	NA	ND	ND	ND	NA	NA
Semivolatile Organic Compounds (UG/KG)										
Acenaphthylene	--	340,000	22,000	340 U	350 U	350 U	21 UJ	2.0 J	10 U	10 U
Anthracene	--	1,700,000	360,000	340 U	350 U	350 U	1.0 J	2.0 J	10 U	10 U
Benzo(a)anthracene	--	150	10	340 U	350 U	350 U	4.0 J	5.0 J	10 U	10 U
Benzo(a)pyrene	--	15	240	340 U	350 U	350 U	13 J	**18 J**	10 U	10 U
Benzo(b)fluoranthene	--	150	35	340 U	350 U	350 U	27 J	**36 J**	10 U	10 U
Benzo(g,h,i)perylene	--	170,000	120,000	340 U	350 U	350 U	19 J	26 J	10 U	10 U
Benzo(k)fluoranthene	--	1,500	350	340 U	350 U	350 U	17 J	24 J	10 U	10 U
bis(2-Ethylhexyl)phthalate	--	35,000	1,400	340 U	180 J	350 U	110 UJ	110 U	75 U	53 U
Chrysene	--	15,000	1,100	340 U	350 U	350 U	9.0 J	15 J	10 U	10 U
Dibenz(a,h)anthracene	--	15	11	340 U	350 U	350 U	21 UJ	7.0 J	10 U	10 U
Fluoranthene	--	230,000	160,000	340 U	350 U	350 U	5.0 J	5.0 J	10 U	10 U
Indeno(1,2,3-cd)pyrene	--	150	120	340 U	350 U	350 UJ	14 J	21 J	10 U	10 U
Pyrene	--	170,000	120,000	340 U	350 U	350 U	6.0 J	7.0 J	10 U	10 U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
No Detections	--	--	--	ND	ND	ND	NA	NA	NA	NA
Total Metals (MG/KG)										
Aluminum	35,000	7,700	55,000	10,400	12,100	13,200	16,200	18,600	NA	NA
Antimony	5.8	3.1	0.27	0.73 J	0.61 J	0.64 J	0.050 J	0.080 J	NA	NA
Barium	147	1,500	82	52	100	**181**	**156**	**172**	NA	NA
Beryllium	0.27	16	3.2	0.51 U	0.53 U	0.53 U	0.24	0.22	NA	NA
Calcium	8,840	--	--	6,720	**13,100**	3,570	3,280	3,630	NA	NA
Chromium	72	0.29	0.00083	3.5	4.4	3.1 J	7.5	7.1	NA	NA
Cobalt	16	2.3	0.49	11	9.1	9.7 J	8.0	8.6	NA	NA
Copper	66	310	46	48	39	52	44	49	NA	NA
Iron	38,100	5,500	640	17,700	15,800	17,200	23,600	26,000	NA	NA
Lead	3.3	400	27	1.0 U	1.1	1.2	1.4 J	2.0 J	NA	NA
Magnesium	3,710	--	--	**7,370**	**5,540**	**4,860 J**	**3,880**	**5,070**	NA	NA
Manganese	1,630	180	57	560	715	583 J	543	580	NA	NA
Nickel	22	150	48	3.2 J	4.2 U	2.7 J	3.2	3.4	NA	NA
Potassium	2,000	--	--	521	821	627	840 J	950 J	NA	NA
Selenium	0.51	39	0.26	3.6 U	**0.72 J**	3.7 U	0.36 UJ	0.47 UJ	NA	NA
Sodium	2,250	--	--	513 U	531 U	532 U	169	191	NA	NA
Thallium	0.13	--	0.14	0.51 U	0.017 J	0.53 U	0.072 U	0.094 U	NA	NA
Vanadium	144	39	180	40	36	36	78	77	NA	NA
Zinc	32	2,300	680	**33**	26	23	18	23	NA	NA

Notes:

Exceeds Background UTL
Exceeds Background UTL and Adjusted RSL for Residential Soi
Exceeds Background UTL and SSL (DAF=1)

NA - Not Analyzed
ND - Not Detected
-- Not part of background data set (where applicable) OR Regulatory standard not promulgated
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected significantly greater than that in an associated blank.
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram

Table 3-3
HHRA COPC Summary Table
Site Inspections/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques Island, Puerto Rico

Site: PI-7
Media: Surface Soil, Total Soil
Historical Function: Former Quarry, Tar Drum Disposal Area, and Radar Communication Area

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Frequency of Criteria Exceedance	Range of Detection Limits	Background Value KTd (1)	Max Exceeds Background KTd	November RSL Adjusted (2)		Max Exceeds 100x SL	Cancer Screening Toxicity Value (3)	Non-cancer Screening Toxicity Value (3)	95% UCL (N/T/G)	Statistic	Basis	Target Organ	Hazard Quotient	ELCR
PI-7	7429-90-5	Aluminum	1.0E+04		1.6E+04		mg/kg	VEP7-SO40	6 / 6	6 / 6	2.90E+00 - 2.90E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	--	--
	7440-38-2	Arsenic	1.2E+01		1.2E+01		mg/kg	VNTR-PI7-3	1 / 10	1 / 10	3.6E-01 - 1.1E+00	1.6E+00	Yes	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	--	--
Surface Soil	7440-47-3	Chromium	3.2E+00	J	8.6E+00		mg/kg	VEP7-SO40	9 / 9	9 / 9	2.00E-01 - 2.00E-01	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	--	--
	7440-48-4	Cobalt	6.9E+00		1.2E+01		mg/kg	EPI07-SO14	9 / 9	9 / 9	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	--	--
	7439-89-6	Iron	1.5E+04		2.8E+04		mg/kg	VEP7-SO40	6 / 6	6 / 6	1.31E+00 - 1.31E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	--	--
	7439-96-5	Manganese	4.8E+02		7.5E+02		mg/kg	VEP7-SO40	6 / 6	6 / 6	1.60E-01 - 1.60E-01	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	--	--
	7440-62-2	Vanadium	3.3E+01		8.8E+01		mg/kg	VEP7-SO40	9 / 9	5 / 9	8.00E-02 - 8.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	--	--
	50-32-8	Benzo(a)pyrene	1.8E-01	J	1.8E-01	J	mg/kg	VEP7-SO40	1 / 10	1 / 10	3.50E-03 - 4.00E-03	NA	No	1.5E-02	ca	No	1.5E-02	--	--	--	Max	--	--	--
	205-99-2	Benzo(b)fluoranthene	3.4E-01	J	3.4E-01	J	mg/kg	VEP7-SO40	1 / 10	1 / 10	3.60E-03 - 8.00E-03	NA	No	1.5E-01	ca	No	1.5E-01	--	--	--	Max	--	--	--
	53-70-3	Dibenz(a,h)anthracene	5.7E-02	J	5.7E-02	J	mg/kg	VEP7-SO40	1 / 10	1 / 10	2.00E-03 - 4.40E-03	NA	No	1.5E-02	ca	No	1.5E-02	--	--	--	Max	--	--	--
	193-39-5	Indeno(1,2,3-cd)pyrene	2.1E-01	J	2.1E-01	J	mg/kg	VEP7-SO40	1 / 10	1 / 10	2.00E-03 - 5.20E-03	NA	No	1.5E-01	ca	No	1.5E-01	--	--	--	Max	--	--	--
PI-7	7429-90-5	Aluminum	1.0E+04		1.9E+04		mg/kg	VEP7-SO40	10 / 10	10 / 10	2.70E+00 - 2.90E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	0.2	--
Total Soil	7440-38-2	Arsenic	1.2E+01		1.2E+01		mg/kg	VNTR-PI7-3	1 / 14	1 / 14	3.6E-01 - 1.1E+00	1.6E+00	Yes	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	0.5	3.1E-05
	7440-47-3	Chromium	3.1E+00	J	8.6E+00		mg/kg	VEP7-SO40	13 / 13	13 / 13	2.00E-01 - 2.00E-01	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	0.00007	--
	7440-48-4	Cobalt	6.9E+00		1.2E+01		mg/kg	EPI07-SO14	13 / 13	13 / 13	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	0.5	3.1E-08
	7439-89-6	Iron	1.5E+04		2.8E+04		mg/kg	VEP7-SO40	10 / 10	10 / 10	1.22E+00 - 1.31E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	0.5	--
	7439-96-5	Manganese	4.8E+02		7.5E+02		mg/kg	VEP7-SO40	10 / 10	10 / 10	1.50E-01 - 1.60E-01	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	0.4	--
	7440-62-2	Vanadium	3.3E+01		8.8E+01		mg/kg	VEP7-SO40	13 / 13	7 / 13	7.00E-02 - 8.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	0.2	--
	50-32-8	Benzo(a)pyrene	1.8E-02	J	1.8E-01	J	mg/kg	VEP7-SO40	2 / 15	2 / 15	3.00E-03 - 4.00E-03	NA	No	1.5E-02	ca	No	1.5E-02	--	--	--	Max	--	--	1.2E-05
	205-99-2	Benzo(b)fluoranthene	3.6E-02	J	3.4E-01	J	mg/kg	VEP7-SO40	2 / 15	1 / 15	3.40E-03 - 8.00E-03	NA	No	1.5E-01	ca	No	1.5E-01	--	--	--	Max	--	--	2.3E-06
	53-70-3	Dibenz(a,h)anthracene	7.0E-03	J	5.7E-02	J	mg/kg	VEP7-SO40	2 / 15	1 / 15	2.00E-03 - 4.40E-03	NA	No	1.5E-02	ca	No	1.5E-02	--	--	--	Max	--	--	3.8E-06
	193-39-5	Indeno(1,2,3-cd)pyrene	2.1E-02	J	2.1E-01	J	mg/kg	VEP7-SO40	2 / 15	1 / 15	2.00E-03 - 5.20E-03	NA	No	1.5E-01	ca	No	1.5E-01	--	--	--	Max	--	--	1.4E-06

Site Cumulative Risk	Max HI *	ELCR
Soil	0.7	5E-05
Total Risk	0.7	5E-05

Note:
(1) East Vieques Soil Type KTd
(2) Regional Screening Levels for Residential Soil (November 2010). Concentrations based on non-carcinogenic health effects are adjusted using HQ=0.1.
(3) Regional Screening Levels for Residential Soil (November 2010) based on an ELCR of $1x10^{6}$ and an HQ=1.0

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

ca = Carcinogenic
nc = Noncarcinogenic
J = compound was detected below the reporting limit in the sample
ELCR = Excess Lifetime Cancer Risk
CNS = Central nervous System

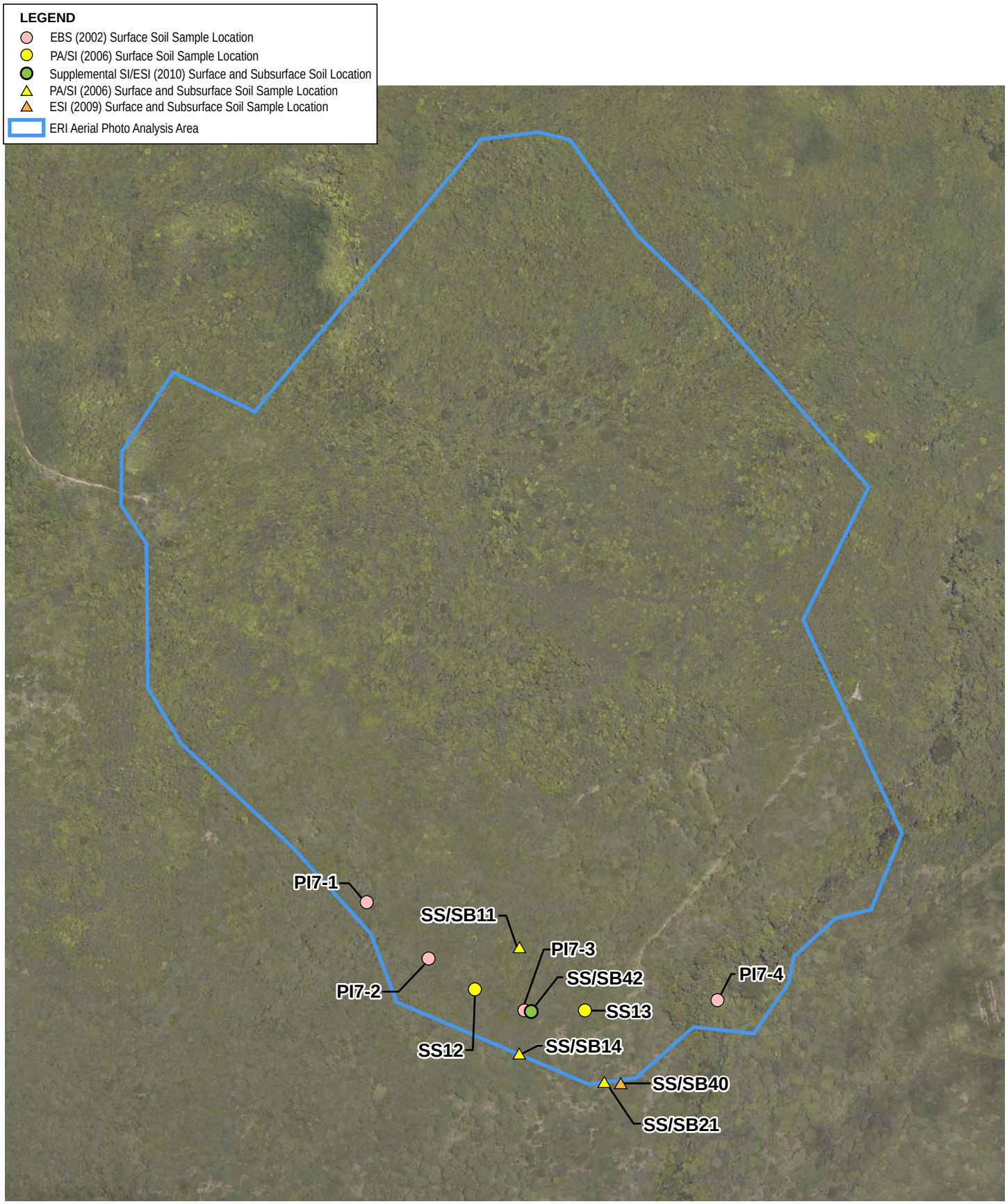
* - Max HI is the highest HI associated with any target organ or critical effect.

Table 3-4
Ecological Risk Assessment Screening Statistics for PI-7 Surface Soil - Plants and Invertebrates
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Screening Value	Frequency of Exceedance	Maximum Hazard Quotient	Background UTL	Frequency of UTL Exceedance	Mean Ratio	Maximum Ratio	95% UCL Hazard Quotient	Mean Hazard Quotient
Central Subsection Inorganics (MG/KG)																
Copper	-- - --	9 / 9	33.1	82.90	48.9	14.71	58.01	70.0	1 / 9	1.18	66.0	1 / 9	0.74	1.26	0.83	0.70
Selenium	0.25 - 1.9	3 / 9	0.51	0.60	0.77	0.62	1.15	0.52	2 / 9	1.15	0.51	3 / 9	1.51	1.18	2.22	1.48

Table 3-5
Decision Tree Summary
PI 7 - Central Subsection (Former Quarry), PI7-3 Vicinity
Site Inspection/Expanded Site Inspection Addendum Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 2 Data Quality Acceptable?	Step 3 Inorganics Above Background or Non-inorganics Detected?	Step 4 Potentially Attributable to CERCLA Release?	Step 5 Exceedances of Comparison Criteria?	Step 6 More Realistic Evaluation?	Step 7 Medium Sufficiently Characterized?
Surface Soil (EBS)	Yes	Yes	Inorganics	Yes	As > RSL, SSL, BKG	within acceptable risk range; not detected in groundwater	Medium sufficiently characterized; no further investigation or action for medium
Surface Soil (SI)	Yes	Yes	Pesticides	No	N/A	N/A	Medium sufficiently characterized; no further investigation or action for medium
			Inorganics	Yes	Ba > SSL, BKG	detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
					Cu > ECO, SSL, BKG	ECO risk acceptable; not detected in groundwater; < SSL at a DAF of 2	
					Se > ECO, SSL, BKG	ECO based on plants; no sign of stress to plants; < ECO for soil invertebrates; detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
Subsurface Soil (SI)	Yes	Yes	SVOCs	Yes	No	N/A	Medium sufficiently characterized; no further investigation or action for medium
			Inorganics	Yes	Ba > SSL, BKG	detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
					Se > SSL, BKG	detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
Surface Soil (ESI)	Yes	Yes	SVOCs	Yes	B(a)A > SSL	not detected in groundwater	Medium sufficiently characterized; no further investigation or action for medium
					B(a)P > RSL	within acceptable risk range	
					B(b)F > RSL, SSL	within acceptable risk range; not detected in groundwater	
					D(a,h)A > RSL, SSL	within acceptable risk range; not detected in groundwater	
					I(123cd)P > RSL, SSL	within acceptable risk range; not detected in groundwater	
					PCP > SSL	not detected in groundwater	
			Inorganics	Yes	Ba > SSL, BKG	detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
Subsurface Soil (ESI)	Yes	Yes	SVOCs	Yes	B(a)P > RSL	within acceptable risk range; not detected in groundwater	Medium sufficiently characterized; no further investigation or action for medium
					B(b)F > SSL	not detected in groundwater	
			Inorganics	Yes	Ba > SSL, BKG	detected in groundwater below tap water RSL and MCL; < SSL at a DAF of 3	
Surface Soil (Supplemental ESI)	Yes	Yes	No	No	N/A	N/A	Medium sufficiently characterized; no further investigation or action for medium
Subsurface Soil (Supplemental ESI)	Yes	Yes	No	No	N/A	N/A	Medium sufficiently characterized; no further investigation or action for medium



North

0 50 100
Feet

FIGURE 3-1
PI 7 Central Subsection – Former Quarry
Site Inspection/Expanded Site Inspection Report Addendum, PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

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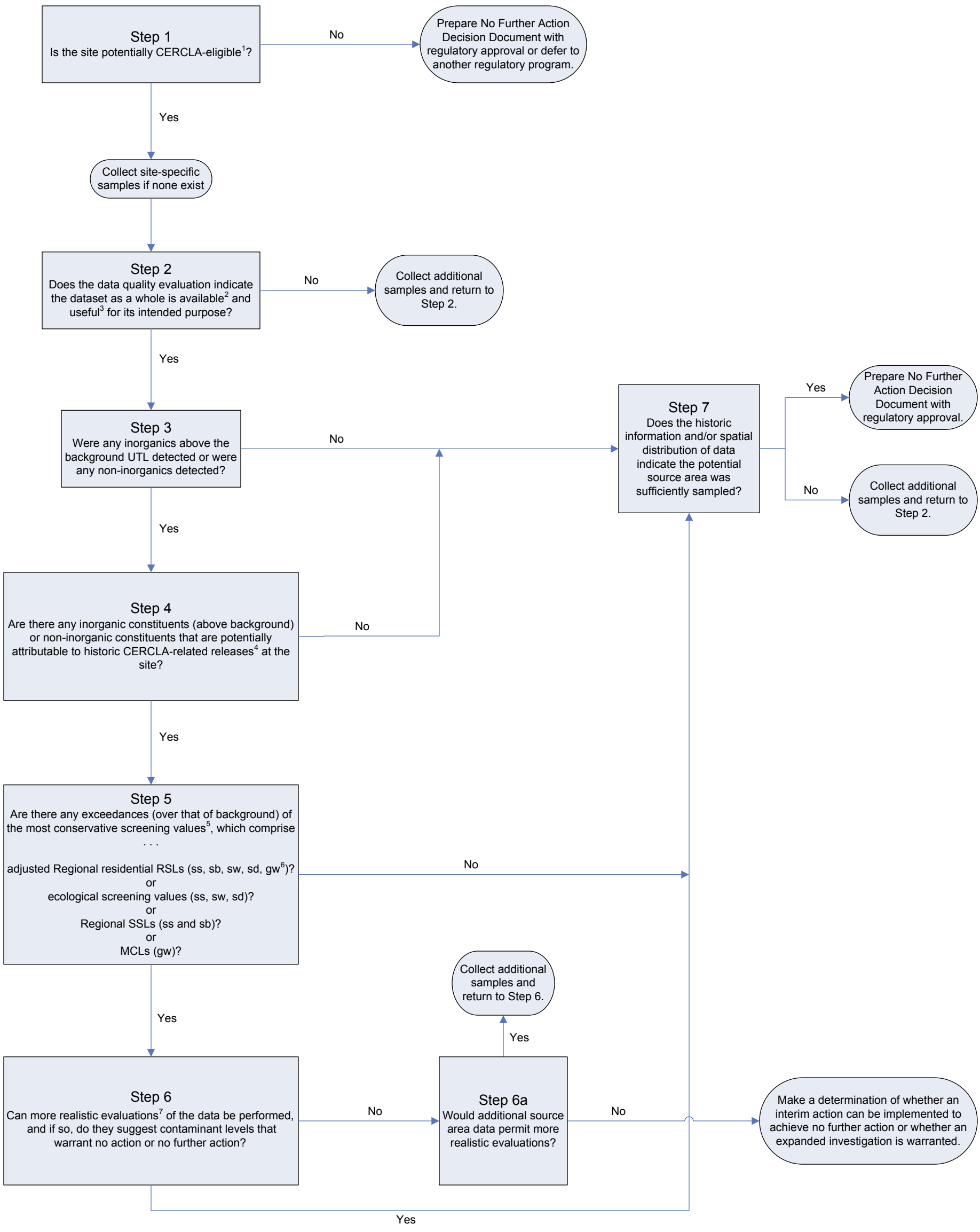

Notes:
The decision makers associated with this decision tree are the Navy, USEPA, PREQB, and USFWS.

[1] Determination of CERCLA eligibility is described in Section 1 of the SI/ESI Report (August 2010)

[2] "Available" data are described in Section 1 of the SI/ESI Report (August 2010)

[3] "Useful" data are described in Section 1 of the SI/ESI Report (August 2010)

[4] CERCLA-related releases are defined in Section 1 of the SI/ESI Report (August 2010)

[5] For UST sites, PREQB Land Pollution Control Corrective Action Levels

[6] ss = surface soil; sb = subsurface soil; sw = surface water; sd = sediment; gw = groundwater

[7] Examples of the types of more realistic evaluations that may be performed are described in Section 1 of the SI/ESI Report (August 2010)

FIGURE 3-2
Data Evaluation Decision Tree
Site Inspection/Expanded Site Inspection Report Addendum, PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

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SECTION 4

PAOC Q—Former Boiler Room in Heat Plant Building 607

This section presents the results of the Supplemental SI performed at PAOC Q—Former Boiler Room in Heat Plant Building 607 at the Former VNTR. PAOC Q is located within the west-central portion of Camp Garcia (**Figure 1-1**). As discussed in Section 21 of the Final SI/ESI Report (CH2M HILL, 2010), the surface soil data collected at this site during the SI represented soil cover material placed on the site instead of soil from the original site. Therefore, in accordance with recommendations made in Section 21.4 of the SI/ESI Report, the site was re-sampled to ensure soil representative of the original site's surface and subsurface soil horizons (i.e., when the site was active and potential CERCLA-related releases could have occurred) was collected for evaluation.

4.1 Conceptual Site Model

The CSM for PAOC Q is based on review of historical information such as records, aerial photographs, site inspection documentation, and interviews; as well as site-specific data collection, and is presented in Section 21.1 of the Final SI/ESI Report (CH2M HILL, 2010). Since the objective of the supplemental sampling at PAOC Q was to re-sample an existing location, the CSM presented in the SI/ESI Report is still applicable and, therefore, is not repeated here. The reader is instead referred to Section 21.1 of the Final SI/ESI Report.

4.2 Sampling Approach and Chemical Constituents Identified

To determine if a release of hazardous constituents occurred at PAOC Q, in accordance with the Final SI/ESI SAP (CH2M HILL, 2009), one soil boring was installed during the 2009 SI. One co-located surface soil and subsurface soil sample (i.e., SS/SB01 associated with the orange triangle in **Figure 4-1**) was collected within the former footprint of Building 607 (PAOC Q). Because approximately 2 to 3 feet of soil/gravel was placed over the PAOC Q sampling location prior to sampling, only the subsurface soil sample collected at the PAOC Q location during the 2009 SI is representative of soil present when potential releases from historical activities at the site would have occurred. The surface soil sample collected at the site is representative of the soil cover material placed there during the USFWS road improvement activities.

No PID readings above 0.0 ppm were observed in the 2009 SI soil boring (see Soil Boring Logs, in Appendix A of the Final SI/ESI Report (CH2M HILL 2010)); therefore, the subsurface soil sample at PAOC Q was collected at the default depth in accordance with the SI/ESI SAP. The surface and subsurface soil samples collected during the 2009 SI were analyzed for TCL VOCs and SVOCs, and TAL inorganics.

During the 2010 Supplemental SI, soil samples were collected from approximately the same PAOC Q location from which they were collected during the 2009 SI. The soil/gravel gravel cover material was removed and set aside prior to sampling. Then, a slide hammer was

used to collect a co-located surface soil and subsurface soil sample (i.e., SS/SB01 associated with the pink diamond in **Figure 4-1**) from within the former footprint of Building 607 (PAOC Q).

The surface fill material at this location was identified by its resemblance to PAOC Q and PAOC R historical sample locations fill material, a gravelly well graded sand or sandy gravel. Gravelly well graded sand is fill material that is noted as being present on the original boring log from 0.0-2.2′ bgs. Well graded sand with gravel was observed from 2.2-3.2′ bgs. The sand from 0-3.2′ bgs was observed to be loose which is another characteristic of fill material, being that it was not naturally deposited at this location. In addition, the original land surface elevation (i.e., where fill was placed) is visible immediately adjacent to the sampling location.

A visible fill/native soil contact was noted on the boring log at 4.0′ bgs as "natural organics within this interval appears to be old topsoil layer." Dried and partially decomposed plant matter was observed and trace fine root structure was visible within the soil. To further support that this was the old topsoil layer, the underlying soil from 4.2-5.0′ bgs was noted to be silt with fine sand, and its consistency was noted as dense.

No PID readings above 0.0 ppm were observed in the Supplemental SI soil boring (see Soil Boring Logs, in Appendix A of this report), and the surface and subsurface samples at PAOC Q were collected in accordance with the SI/ESI SAP. The surface and subsurface soil samples collected during the 2010 Supplemental SI were analyzed for TCL VOCs and SVOCs, and TAL inorganics.

Tables 4-1 and 4-2 summarize the constituents detected in PAOC Q surface soil and subsurface soil samples collected during the SI (2009) and the Supplemental SI (2010). The surface soil data from the SI are not included in this summary because the soil was not representative of native soil; it was representative of the cover material placed during road improvement activities. The subsurface soil sample collected during the SI (2009) was from a depth consistent with surface soil conditions of the original site. Therefore, the SI subsurface soil sample data are included with the Supplemental SI (2010) surface soil data for evaluation of surface soil conditions. The tables also identify background and screening criteria exceedances. Raw analytical data for the SI samples are provided in Appendix K of the Final SI/ESI Report (CH2M HILL 2010). Raw analytical data for the Supplemental SI are provided in Appendix B of this report.

4.3 PAOC Q Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Decision Tree (**Figure 3-2**) with reference to the detection tables (Tables 4-1 and 4-2).

Step 1: Is the site potentially CERCLA-eligible?

Historical information suggests the site was a former boiler room in a heat plant building. Although there are no records of past releases at the site and there was no evidence of past releases observed during the site visits, the potential presence of CERCLA hazardous substances could not be confidently ruled out without sample collection due to the nature of the historical activities at the site. Sample collection took place during the 2009 SI and the 2010 Supplemental SI. Therefore, the decision analysis proceeds to Step 2.

Step 2: Does the data quality evaluation indicate the dataset as a whole is available and useful for the intended purpose?

ESI (2009)

Appendix M of the Final SI/ESI Report (CH2M HILL 2010) discusses the evaluation of the PAOC Q data quality. As detailed in Appendix M, the PAOC Q data are available for evaluating whether a release of hazardous waste or hazardous constituents warranting further action occurred at PAOC Q. However, only the subsurface soil sample from PAOC Q is useful for this purpose (see Steps 3 through 7 below) because the surface soil sample was not collected in soil representative of surficial conditions present when historical activities at the sites took place. Therefore, the SI surface soil sample data are not included in the decision analysis steps below. As noted previously, the SI subsurface soil sample data are included as surface soil data because they are representative of the surface soil horizon of the original site.

Supplemental SI/ESI (2010)

Appendix C presents the data quality evaluation of the Supplemental SI analytical data for PAOC Q. Based on this evaluation of the Supplemental SI data, 100 percent of the data are acceptable for use. Additionally, the site-specific data set exceeded the 95 percent project completeness goal, achieving 100 percent completeness.

Step 3: Were any inorganics above the background UTL detected or were any non-inorganics detected?

For the samples collected during the SI (2009) and the Supplemental SI (2010), the following inorganics above the background UTLs and non-inorganics were detected by sampling event and by medium:

SI (2009) Surface Soil (sample SB01-46-0209)

- VOCs: None detected
- SVOCs: None detected
- Inorganics above background UTLs: Copper and Magnesium

Supplemental SI (2010) Surface Soil (sample SS01-0405-0810)

- VOCs: Acetone and Toluene
- SVOCs : Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and PAH HMW
- Inorganics above background UTLs : Beryllium and Magnesium

Supplemental SI (2010) Subsurface Soil (sample SB01-0810-0810)

- VOCs: Acetone

SVOCs : No detections

- Inorganics above background UTLs : Calcium, Magnesium, and Zinc

Step 4: Are there any inorganic constituents above background or non-inorganic constituents that are potentially attributable to historic CERCLA-related releases at the site?

There are no records or visual evidence of past releases at PAOC Q. However, the applicable soil samples collected during the 2009 SI and 2010 Supplemental SI show detected VOC, SVOC, and inorganic constituents that are potentially attributable to CERCLA-related releases at PAOC Q based on the potential source area at PAOC Q (i.e., the former boiler room in the heat plant building). Therefore, all detected constituents in surface and subsurface soil are further considered in the decision analysis process.

Step 5: For potentially complete exposure pathways, are there any exceedances (over that of background) of the most conservative screening values?

In this step of the decision analysis, the data for the CERCLA-related constituents identified in Step 4 are compared to the screening criteria described in Section 1 of the Final SI/ESI Report (CH2M HILL, 2010) and shown on the detection tables. Those constituents that exceed one or more criteria (and background for inorganics) are listed below by sampling event and by medium.

SI (2009) Surface Soil (sample SB01-46-0209)

- Copper: one detection (sample SB01-46-0209) at a concentration (77 mg/kg) above the ecological soil screening value (70 mg/kg), the SSL at a DAF of 1 (46 mg/kg), and background UTL (66 mg/kg)

Supplemental SI (2010) Surface Soil (sample SS01-0405-0810)

- No exceedances

Supplemental SI (2010) Subsurface Soil (sample SB01-0810-0810)

- No exceedances

As shown above, there is an exceedance of the most conservative screening values. Therefore, the decision analysis process continues to Step 6.

Step 6: Can more realistic evaluations of the data be performed, and if so, do they suggest contaminant levels warrant no further investigation or action?

Human Health Evaluation

As a conservative approach, risk estimates were prepared for a future residential scenario at PAOC Q. The site is less than 0.003 acre in size, whereas a residential lot may be approximately 0.75 acre. No chemicals in soil were detected above background and adjusted RSLs at concentrations exceeding 100 times the screening levels (see Table 4-3). Therefore, no hot spots were identified and all soil data were merged in the residential evaluation.

No constituents were detected in surface soil or total soil (0-6 ft bgs) samples above the adjusted human health screening levels and background UTLs (Table 4-3). Seven constituents (aluminum, arsenic, chromium, cobalt, iron, manganese, and vanadium) were detected in soil above adjusted human health screening levels but below background UTLs. Based on the environmental conditions on Vieques (see Appendix R of the Final SI/ESI Report (CH2M HILL 2010)), the form of chromium expected to be present at the site is Cr^{3+}, especially considering its detected concentrations are within background levels. Based on

maximum detected concentrations of the seven constituents, the cumulative ELCR is 3×10^{-6} and the maximum target organ-specific HI is 0.9. Consequently, there is not a concern for potential cumulative effects from multiple constituents in site soil relative to background.

Ecological Evaluation

A quantitative ecological evaluation is not warranted for PAOC Q because the historic surface soil (or the surface soil representative of potential releases as a result of historical activities) was covered by 2 to 3 feet of soil/gravel cover material. As a result, even though there is an ecological screening value exceedance for copper, the surface soil does not pose an unacceptable risk to ecological receptors.

Additional Comparisons

When evaluating the potential for contaminant migration from soils to groundwater, the use of EPA generic soil screening levels (SSLs), applying a dilution attenuation factor (DAF) of 1, were used as the most conservative approach. However, as a general rule, DAF values from 1 to 20* can be applied dependent upon site-specific data (e.g., size of site, depth to groundwater, etc.). In addition, in the absence of groundwater data, other information such as that listed below was used, as applicable, to evaluate the potential for groundwater impacts from soil contamination:

- depth of contamination with respect to estimated groundwater depth
- mobility of contaminant
- number of exceedances

*SSLs for DAF values of 1 and 20 are provided in Table 1 of Appendix A of the EPA Generic SSL guidance (EPA 2002). Estimated SSLs for DAF values in between 1 and 20 were used in this evaluation.

Copper was detected in surface soil above the SSL at a DAF of 1 and background UTL; however, it was not detected in the closest downgradient groundwater (i.e., wells EPAN-MW01, MW02, and EPAS-MW01 [see Tables 18-3 and 22-3 of the SI/ESI Report]; locations shown in **Figure 4-2**), and it was detected several orders of magnitude below the Federal Maximum Contaminant Level (MCL) in the regional wells installed along the southern boundary of Camp Garcia (i.e., wells VECG-MW01 and MW02 [see Table 24-1 of the SI/ESI Report]; locations shown in **Figure 4-2**). Further, there are multiple sites evaluated in the SI/ESI Report (CH2M HILL, 2010) where soil and groundwater samples collected at or near each other showed SSLs are not realistic predictors of leaching to groundwater (i.e., they overestimate leaching). This suggests the SSLs at a DAF of 1 are not realistic predictors of metals leaching to groundwater.

Step 7: Does the historic information and/or spatial distribution of data indicate the potential source area was sufficiently sampled?

The historical information (aerial photographs, interviews, site inspections) indicates the most likely source of CERCLA-related releases is the former boiler room in heat plant building 607. Based on this information, soil samples were collected in this area. Including the supplemental sampling, the spatial distribution of the data indicates the potential source area was sufficiently sampled.

4.4 Conclusions and Recommendations

Table 4-4 summarizes the results of the decision analysis for PAOC Q. As shown in Table 4-4, the surface and subsurface soil data indicate the area has been sufficiently characterized. The data also indicate there has not been a CERCLA-related release at the site that has resulted in contamination of soil at concentrations that would pose a potentially unacceptable risk to human or ecological receptors or leaching concern for groundwater. Therefore, based on the above information, no further investigation or action is warranted for PAOC Q; a no action decision document will be prepared for the site.

Table 4-1
Surface Soil Detection and Exceedance Results
PAOC Q
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	Background UTL (KTd)	Adjusted RSL for Residential Soil	Eco (E)	SSL (DAF=1)	VEPQ/R-SO01	
Sample ID					VEPQ/R-SB01-46-0209	VEPQ/R-SS01-0405-0810
Sample Date					02/23/09	08/11/10
Chemical Name						
Volatile Organic Compounds (UG/KG)						
Acetone	--	6,100,000	--	4,500	43 U	7.3 J
Toluene	--	500,000	40,000	1,000	6.0 U	1.9 J
Semivolatile Organic Compounds (UG/KG)						
Dibenz(a,h)anthracene	--	15	--	11	25 U	7.7 J
Indeno(1,2,3-cd)pyrene	--	150	--	120	25 U	11 J
PAH HMW (Total)	--	--	18,000	--	NA	19 J
PAH LMW (Total)	--	--	29,000	--	NA	0 U
Total Metals (MG/KG)						
Aluminum	35,000	7,700	--	55,000	29,800	33,800 J
Antimony	5.8	3.1	78	0.27	0.10 UJ	0.62 J
Arsenic	1.6	0.39	18	0.29	0.65	0.99
Barium	147	1,500	330	82	83	81 J
Beryllium	0.27	16	40	3.2	0.24	**0.37**
Cadmium	2.2	7.0	32	0.38	0.10 U	0.030 J
Calcium	8,840	--	--	--	4,770	6,500 J
Chromium	72	0.29	64	0.00083	17	16 J
Cobalt	16	2.3	13	0.49	12	12
Copper	66	310	70	46	**77 J**	52 J
Iron	38,100	5,500	--	640	32,800	35,300
Lead	5.4	400	120	27	1.5	2.1
Magnesium	3,710	--	--	--	**7,120**	**4,980 J**
Manganese	1,630	180	220	57	746	551 J
Nickel	22	150	38	48	10	7.1 J
Potassium	5,270	--	--	--	1,440 J	1,310 J
Silver	0.22	39	560	1.6	0.10 U	0.020 J
Sodium	1,590	--	--	--	465 J	394 J
Thallium	0.13	--	1.0	0.002	0.10 U	0.040 J
Vanadium	144	39	130	180	105	114
Zinc	32	2,300	120	680	31	28

Notes:

Exceeds Background UTL

Exceeds Background UTL, ECO (E) and SSL (DAF=1)

NA - Not Analyzed
-- Not part of background data set (where applicable) OR Regulatory standard not promulgated
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected significantly greater than that in an associated blank.
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram

Table 4-2
Subsurface Soil Detection and Exceedance Results
PAOC Q
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	**Background UTL (KTd)**	**Adjusted RSL for Residential Soil**	**SSL (DAF=1)**	**VEPQ/R-SO01**
Sample ID				**VEPQ/R-SB01-0810-0810**
Sample Date				**08/11/10**
Chemical Name				
Volatile Organic Compounds (UG/KG)				
Acetone	--	6,100,000	4,500	34
Semivolatile Organic Compounds (UG/KG)				
No Detections	**--**	**--**	**--**	ND
Total Metals (MG/KG)				
Aluminum	35,000	7,700	55,000	20,600 J
Arsenic	1.6	0.39	0.29	0.49
Barium	147	1,500	82	103 J
Beryllium	0.27	16	3.2	0.22
Cadmium	2.2	7.0	0.38	0.060 J
Calcium	8,840	--	--	**14,100 J**
Chromium	72	0.29	0.00083	21 J
Cobalt	16	2.3	0.49	12
Copper	66	310	46	66 J
Iron	38,100	5,500	640	30,800
Lead	5.4	400	27	1.5
Magnesium	3,710	--	--	**5,160 J**
Manganese	1,630	180	57	789 J
Nickel	22	150	48	9.0 J
Potassium	5,270	--	--	1,540 J
Sodium	1,590	--	--	402 J
Thallium	0.13	--	0.002	0.030 J
Vanadium	144	39	180	127
Zinc	32	2,300	680	**33**

Notes:

Exceeds Background UTL

ND - None Detected

-- Not part of background data set (where applicable) OR Regulatory standard not promulgated

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

MG/KG - Milligrams per kilogram

UG/KG - Micrograms per kilogram

Table 4-3
HHRA COPC Summary Table
Site Inspections/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques Island, Puerto Rico

Site: PAOC-Q
Media: Surface Soil, Total Soil
Historical Function: Former Boiler Room in Heat Plant Building 607

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Frequency of Criteria Exceedance	Range of Detection Limits	Background Value KTd (1)	Max Exceeds Background KTd	November RSL Adjusted (2)		Max Exceeds 100x SL	Cancer Screening Toxicity Value (3)	Non-cancer Screening Toxicity Value (3)	95% UCL (N/T/G)	Statistic	Basis	Target Organ	Hazard Quotient	ELCR
PAOC Q	7429-90-5	Aluminum	3.0E+04		3.4E+04	J	mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	2.01E+00 - 2.30E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	--	--
Surface Soil	7440-38-2	Arsenic	6.5E-01		9.9E-01		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	1.10E-01 - 1.60E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	--	--
	7440-47-3	Chromium	1.6E+01	J	1.7E+01		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	6.00E-02 - 1.00E-01	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	--	--
	7440-48-4	Cobalt	1.2E+01		1.2E+01		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	--	--
	7439-89-6	Iron	3.3E+04		3.5E+04		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	6.20E-01 - 1.57E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	--	--
	7439-96-5	Manganese	5.5E+02	J	7.5E+02		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	9.00E-02 - 4.10E-01	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	--	--
	7440-62-2	Vanadium	1.1E+02		1.1E+02		mg/kg	VEPQ/R-SO01	2 / 2	2 / 2	7.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	--	--
PAOC Q	7429-90-5	Aluminum	2.1E+04	J	3.4E+04	J	mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	1.96E+00 - 2.30E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	0.4	--
Total Soil	7440-38-2	Arsenic	4.9E-01		9.9E-01		mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	1.00E-01 - 1.60E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	0.05	2.5E-06
	7440-47-3	Chromium	1.6E+01	J	2.1E+01	J	mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	5.00E-02 - 1.00E-01	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	0.0002	--
	7440-48-4	Cobalt	1.2E+01		1.2E+01		mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	0.5	3.3E-08
	7439-89-6	Iron	3.1E+04		3.5E+04		mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	6.20E-01 - 1.57E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	0.6	--
	7439-96-5	Manganese	5.5E+02	J	7.9E+02	J	mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	9.00E-02 - 4.10E-01	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	0.4	--
	7440-62-2	Vanadium	1.1E+02		1.3E+02		mg/kg	VEPQ/R-SO01	3 / 3	3 / 3	7.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	0.3	--

Site Cumulative Risk	Max HI *	ELCR
Soil	0.9	3E-06
Total Risk	0.9	3E-06

Note:
(1) East Vieques Soil Type KTd
(2) Regional Screening Levels for Residential Soil (November 2010). Concentrations based on non-carcinogenic health effects are adjusted using HQ=0.1.
(3) Regional Screening Levels for Residential Soil (November 2010) based on an ELCR of $1x10^{-6}$ and an HQ=1.0

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

ca = Carcinogenic
nc = Noncarcinogenic
J = compound was detected below the reporting limit in the sample
ELCR = Excess Lifetime Cancer Risk
CNS = Central nervous System

* - Max HI is the highest HI associated with any target organ or critical effect.

Table 4-4
Decision Tree Summary
PAOC Q - Former Boiler Room in Heat Plant Building 607
Site Inspection/Expanded Site Inspection Addendum Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 2 Data Quality Acceptable?	Step 3 Inorganics Above Background or Non-inorganics Detected?	Step 4 Potentially Attributable to CERCLA Release?	Step 5 Exceedances of Comparison Criteria?	Step 6 More Realistic Evaluation?	Step 7 Medium Sufficiently Characterized?
Surface Soil (SI)	Yes	Yes	Inorganics	Yes	Cu > ECO, SSL, BKG	not detected in nearest downgradient groundwater; < SSL at a DAF of 2	Medium sufficiently characterized; no further investigation or action for medium
Surface Soil (Supplemental SI)	Yes	Yes	VOCs	Yes	No	N/A	Medium sufficiently characterized; no further investigation or action for medium
			SVOCs	Yes	No	N/A	
			Inorganics	Yes	No	N/A	
Subsurface Soil (Supplemental SI)	Yes	Yes	VOCs	Yes	No	N/A	Medium sufficiently characterized; no further investigation or action for medium
			Inorganics	Yes	No	N/A	

Legend

- Camp Garcia Area
- Supplemental SI Surface and Subsurface Soil Sampling Location
- SI Surface and Subsurface Soil Sampling Location

FIGURE 4-1
PAOC Q Soil Sample Locations
1983 Aerial Photograph
Site Inspection/Expanded Site Inspection Report Addendum, PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

CH2MHILL

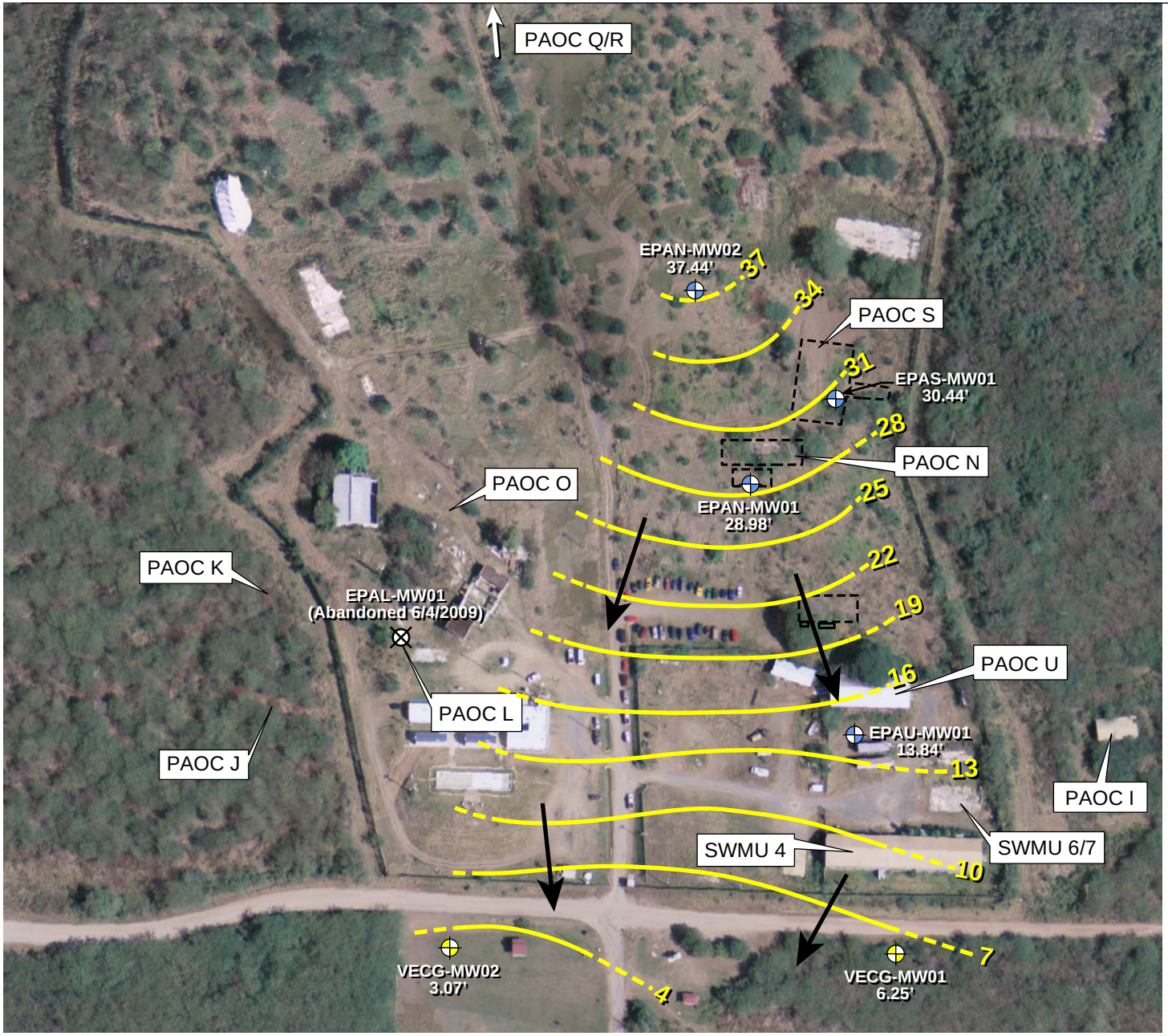
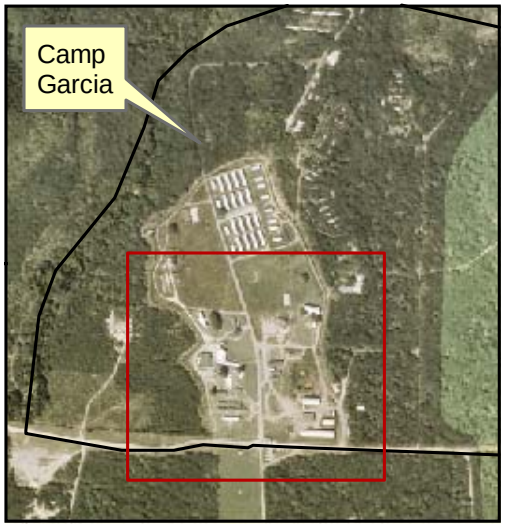


PHOTO DATE: 2007

PHOTO DATE 1983



LEGEND

- SI/ESI Monitoring Well Location
- PA/SI Monitoring Well Location
- Abandonded Well
- Groundwater FLow Direction
- Estimated Potentiometric Contour
- Dashed Where Estimated
- 37 Potentiometric Contour in Feet Above Mean Sea Level
- 37.44' Feet of Water Above Mean Sea Level (6/12/09)

North

0 150 300 Feet

FIGURE 4-2
Potentiometric Surface Map of Camp Garcia
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

CH2MHILL

SECTION 5

PAOC R—Former Boiler Room in Heat Plant Building 617

This section presents the results of the Supplemental SI performed at PAOC R—Former Boiler Room in Heat Plant Building 617 at the Former VNTR. PAOC R is located within the west-central portion of Camp Garcia (**Figure 1-1**). As discussed in Section 21 of the Final SI/ESI Report (CH2M HILL, 2010), the surface soil data collected at this site during the SI represented soil cover material placed on the site instead of soil from the original site. In addition, no subsurface soil sample was collected due to refusal. Therefore, in accordance with recommendations made in Section 21.4 of the SI/ESI Report, the site was re-sampled to ensure soil representative of the original site's surface and subsurface soil horizons (i.e., when the site was active and potential CERCLA-related releases could have occurred) was collected for evaluation.

5.1 Conceptual Site Model

The CSM for PAOC R is based on review of historical information such as records, aerial photographs, site inspection documentation, and interviews; as well as site-specific data collection, and is presented in Section 21.1 of the Final SI/ESI Report (CH2M HILL, 2010). Since the objective of the supplemental sampling at PAOC R was to re-sample an existing location, the CSM presented in the SI/ESI Report is still applicable and, therefore, is not repeated here. The reader is instead referred to Section 21.1 of the Final SI/ESI Report..

5.2 Sampling Approach and Chemical Constituents Identified

To determine if a release of hazardous constituents occurred at PAOC R, in accordance with the Final SI/ESI SAP (CH2M HILL, 2009), one soil boring was installed during the 2009 SI. One surface soil sample (i.e., SS02 associated with the orange circle in **Figure 5-1**) was collected at the former boiler room in heat plant building 617 (PAOC R). No subsurface soil sample was taken at SO02, as refusal was reached at 2 ft bgs. Because approximately 2 to 3 feet of soil/gravel was placed over the PAOC R sampling location prior to sampling, the surface soil sample collected at the PAOC R location is not representative of soil present when potential releases from historical activities at the site would have occurred. The surface soil sample collected at the sites is representative of the soil cover material placed there during the USFWS road improvement activities.

No PID readings above 0.0 ppm were observed in the 2009 SI soil boring (see Soil Boring Logs, in Appendix A of the Final SI/ESI Report (CH2M HILL 2010)). The surface soil sample was analyzed for TCL VOCs and SVOCs, and TAL inorganics.

During the 2010 Supplemental SI, soil samples were collected from approximately the same PAOC R location from which one was collected during the 2009 SI. The soil/gravel cover material was removed and set aside prior to sampling. Then, a slide hammer was used to

collect a co-located surface soil and subsurface soil sample (i.e., SS/SB02 associated with the pink diamond in **Figure 5-1**) from within the former footprint of Building 617 (PAOC R).

The surface fill material at this location was identified by its resemblance to PAOC Q and PAOC R historical sample locations fill material, a gravelly well graded sand or sandy gravel. Loose gravel with sand is noted as being present on the original boring log from 2.0-3.0′ bgs.

The visible fill/native soil contact is noted at 3.0′ bgs and was observed as dried plant matter. This shows the division between fill and historical surface soil. The dried plant matter had a fine root system that was observed in the underlying soil. Additional support that this was the fill/native soil contact was that the underlying soil was noted to be well graded sand with trace clay with a distinct color change from that of the fill (from brown to dark yellowish brown), as well as its density being medium dense.

No PID readings above 0.0 ppm were observed in the Supplemental SI soil boring (see Soil Boring Logs, in Appendix A), and the surface and subsurface samples were collected in accordance with the SI/ESI SAP. The surface and subsurface soil samples collected during the 2010 Supplemental SI were analyzed for TCL VOCs and SVOCs, and TAL inorganics.

Tables 5-1 and 5-2 summarize the constituents detected in PAOC R surface soil and subsurface soil samples collected the Supplemental SI (2010). The surface soil data from the SI are not included in the evaluation because the soil was not representative of native soil; it was representative of the cover material placed during road improvement activities. The tables also identify background and screening criteria exceedances. Raw analytical data for the SI samples are provided in Appendix K of the Final SI/ESI Report (CH2M HILL 2010). Raw analytical data for the Supplemental SI/ESI are provided in Appendix B of this report.

5.3 PAOC R Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Decision Tree (**Figure 3-2**) with reference to the detection tables (Tables 5-1 and 5-2).

Step 1: Is the site potentially CERCLA-eligible?

Historical information suggests the site was a former boiler room in a heat plant building. Although there are no records of past releases at the site and there was no evidence of past releases observed during the site visits, the potential presence of CERCLA hazardous substances could not be confidently ruled out without sample collection due to the nature of the historical activities at the site. Sample collection took place during the 2009 SI and the 2010 Supplemental SI. Therefore, the decision analysis proceeds to Step 2.

Step 2: Does the data quality evaluation indicate the dataset as a whole is available and useful for the intended purpose?

ESI (2009)

Appendix M of the Final SI/ESI Report (CH2M HILL 2010) discusses the evaluation of the PAOC R data quality. Although the PAOC R data collected during the SI are available for use, they are not useful for the intended purpose because the sample was not collected in soil representative of conditions present when historical activities at the site took place. Therefore, the 2009 SI soil sample data are not included in the decision analysis steps below.

Supplemental SI/ESI (2010)

Appendix C presents the data quality evaluation of the Supplemental SI analytical data for PAOC R. Based on this evaluation of the Supplemental SI data, 100 percent of the data are acceptable for use. Additionally, the site-specific data set exceeded the 95 percent project completeness goal, achieving 100 percent completeness.

Step 3: Were any inorganics above the background UTL detected or were any non-inorganics detected?

For the samples collected during the Supplemental SI (2010), the following inorganics above the background UTLs and non-inorganics were detected by medium:

Supplemental SI (2010) Surface Soil (SS02)

- VOCs: 2-butanone and Acetone
- SVOCs : Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Fluoranthene, Indeno(1,2,3-cd)pyrene, PAH LMW, PAH HMW, and Pyrene
- Inorganics above background UTLs : Calcium, Magnesium, and Zinc

Supplemental SI (2010) Subsurface Soil (SB02)

- VOCs: Acetone
- SVOCs : Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Carbazole, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene
- Inorganics above background UTLs : Aluminum, Barium, Beryllium, Cobalt, Copper, Iron, Magnesium, Manganese, and Zinc

Step 4: Are there any inorganic constituents above background or non-inorganic constituents that are potentially attributable to historic CERCLA-related releases at the site?

There are no records or visual evidence of past releases at PAOC R. However, the surface soil and subsurface soil samples collected during the 2010 Supplemental SI show detected constituents that are potentially attributable to CERCLA-related releases at PAOC R from the former boiler room. Therefore, all detected constituents in the 2010 surface and subsurface soil samples are further considered in the decision analysis process.

Step 5: For potentially complete exposure pathways, are there any exceedances (over that of background) of the most conservative screening values?

In this step of the decision analysis, the data for the CERCLA-related constituents identified in Step 4 are compared to the screening criteria described in Section 1 of the Final SI/ESI Report (CH2M HILL 2010) and shown on the detection tables. Those constituents that exceed one or more criteria (and background for inorganics) are listed below by location and by medium.

Supplemental SI (2010) Surface Soil (SS02)

- Benzo (a) pyrene: one detection (sample SS02) at a concentration (4.8 µg/kg) above the SSL at a DAF of 1 (0.20 µg/kg)

Supplemental SI (2010) Subsurface Soil (SB02)

- Benzo (a) pyrene: one detection (sample SB02) at a concentration (7.8 µg/kg) above the SSL at a DAF of 1 (0.20 µg/kg)
- Aluminum: one detection (sample SB02) at a concentration (39,400 mg/kg) above the RSL (7,700 mg/kg) and background UTL (35,000 mg/kg)
- Barium: one detection (sample SB02) at a concentration (224 mg/kg) above the SSL at a DAF of 1 (82 mg/kg) and background UTL (147 mg/kg)
- Cobalt: one detection (sample SB02) at a concentration (21 mg/kg) above the RSL (2.3 mg/kg), the SSL at a DAF of 1 (0.49 mg/kg), and background UTL (16 mg/kg)
- Copper: one detection (sample SB02) at a concentration (85 mg/kg) above the SSL at a DAF of 1 (46 mg/kg) and background UTL (66 mg/kg)
- Iron: one detection (sample SB02) at a concentration (39,700 mg/kg) above the RSL (5,500 mg/kg), the SSL at a DAF of 1 (640 mg/kg), and background UTL (38,100 mg/kg)
- Manganese: one detection (sample SB02) at a concentration (2,360 mg/kg) above the RSL (180 mg/kg), the SSL at a DAF of 1 (57 mg/kg), and background UTL (1,630 mg/kg)

As shown above, there are exceedances of the most conservative screening values. Therefore, the decision analysis process continues to Step 6.

Step 6: Can more realistic evaluations of the data be performed, and if so, do they suggest contaminant levels warrant no further investigation or action?

Human Health Evaluation

As a conservative approach, risk estimates were prepared for a future residential scenario at PAOC R. The site is less than 0.003 acre in size, whereas a residential lot may be approximately 0.75 acre. No chemicals in soil were detected above background and adjusted RSLs at concentrations exceeding 100 times the screening levels (see Table 5-3). Therefore, no hot spots were identified and all soil data were merged in the residential evaluation.

No constituents were detected in the surface soil above both the adjusted human health screening levels and background UTLs. Four constituents were detected in total soil (0-6 ft bgs) samples above the adjusted human health screening levels and background UTLs: aluminum, cobalt, iron, and manganese (Table 5-3).

- Aluminum was detected in total soil above its background UTL and adjusted RSL (7,700 mg/kg), at a concentration of 39,400 mg/kg. Based on the maximum detected concentration, the HQ is 0.5, which is within EPA's acceptable level and aluminum would not be identified as a risk driver.
- Cobalt was detected in total soil above its background UTL and adjusted RSL (2.3 mg/kg), at a concentration of 21 mg/kg. Based on the maximum detected concentration,

the HQ is 0.9 and the ELCR is 6 x 10^{-8}, which are within EPA's acceptable levels and cobalt would not be identified as a risk driver.

- Iron was detected in total soil above its background UTL and adjusted RSL (5,500 mg/kg), at a concentration of 39,700 mg/kg. Based on the maximum detected concentration, the HQ is 0.7, which is within the EPA acceptable level and iron would not be identified as a risk driver.
- Manganese was detected in total soil above its background UTL and adjusted RSL (180 mg/kg), at a concentration of 2,360 mg/kg. Based on the maximum detected concentration, the HQ is 1.3, which is slightly above EPA's acceptable level and manganese potentially would be identified as a risk driver. However, the manganese concentration in the duplicate sample was 1,100 mg/kg, which is below the background UTL of 1,630 mg/kg. In addition, the average manganese concentration in the subsurface soil sample is 1,730 mg/kg, which is very similar to the background concentration. Weathered soil derived from the parent rock (granodiorite) at the site is made primarily of clay minerals rich in silica, aluminum, iron, and manganese oxides. Manganese is primarily associated with the weathering of feldspars. The variability in the detected concentrations in soil is likely associated with manganese oxides and attributable to background. Further, the most common anthropogenic source of manganese is steel, which is not likely associated with potential releases from boilers. Also, if there had been a significant release at the site, it is unlikely that manganese would be the only contaminant identified as a risk driver. Given that the only non-inorganic detected was benzo(a)pyrene, and that its concentrations are well below risk-based levels, it is unlikely there was a significant release at the site. In fact, the benzo(a)pyrene may not be associated with a site release. It is a common component of automobile exhaust and may be present due to normal vehicular traffic in the vicinity of the site.

Three additional constituents (arsenic, chromium, and vanadium) were detected in soil above adjusted human health screening levels but below background UTLs. Based on the environmental conditions on Vieques (see Appendix R of the Final SI/ESI Report (CH2M HILL, 2010)), the form of chromium expected to be present at the site is Cr3+, especially considering its detected concentrations are within background levels. Based on the maximum detected concentrations of aluminum, cobalt, iron, manganese, and the three additional constituents, the cumulative ELCR is 3 x 10^{-6} and the maximum target organ-specific HI is 1.8 (primarily due to manganese). Based on the duplicate analytical result for manganese (which is equally as valid as the "normal" sample result), the HQ for manganese is 0.6 and manganese would not be identified as a risk driver (see the COPC Summary Table Supplement, Table 5-4), As indicated in Table 5-4, the cumulative maximum target organ-specific HI is 1.1 when the duplicate result (rather than the "normal" result) is used for manganese. Since the HI is only slightly above the target of 1.1 and the maximum detected concentration was used to calculate the HI, cumulative effects are not expected to be a concern. In addition, the exceedance above 1.0 is due to an inorganic that is likely associated with background. As a conservative estimate of risks and hazards, the maximum concentrations from either surface soil or total soil were used in the calculations.

Ecological Evaluation

There are no ecological screening value exceedances.

Additional Comparisons

When evaluating the potential for contaminant migration from soils to groundwater, the use of EPA generic soil screening levels (SSLs), applying a dilution attenuation factor (DAF) of 1, were used as the most conservative approach. However, as a general rule, DAF values from 1 to 20* can be applied dependent upon site-specific data (e.g., size of site, depth to groundwater, etc.). In addition, in the absence of groundwater data, other information such as that listed below was used, as applicable, to evaluate the potential for groundwater impacts from soil contamination:

- depth of contamination with respect to estimated groundwater depth
- mobility of contaminant
- number of exceedances

*SSLs for DAF values of 1 and 20 are provided in Table 1 of Appendix A of the EPA Generic SSL guidance (EPA 2002). Estimated SSLs for DAF values in between 1 and 20 were used in this evaluation.

Benzo(a)pyrene was the only PAH that exceeded the SSL at a DAF of 1 in surface and subsurface soil. However, no SVOCs were detected in the closest downgradient wells (i.e., wells EPAN-MW01, MW02, and EPAS-MW01 [see Tables 18-3 and 22-3 of the SI/ESI Report]; locations shown in **Figure 4-2**) and benzo(a)pyrene was not detected in the regional wells installed along the southern boundary of Camp Garcia (i.e., wells VECG-MW01 and MW02 [see Table 24-1 of the SI/ESI Report]; locations shown in **Figure 4-2**). This suggests the SSLs at a DAF of 1 are not realistic predictors of SVOC leaching to groundwater.

Five inorganic constituents (barium, cobalt, copper, iron, and manganese) were detected in subsurface soil above their SSLs at a DAF of 1 and background UTLs. However, none of the constituents was detected in downgradient groundwater (see Tables 18-3, 22-3, and 24-1 of the SI/ESI Report [CH2M HILL, 2010]) at concentrations above the MCLs or tap water Regional Screening Levels (RSLs). Further, there are multiple sites evaluated in the SI/ESI Report (CH2M HILL, 2010) where soil and groundwater samples collected at or near each other showed SSLs are not realistic predictors of leaching to groundwater (i.e., they overestimate leaching). This suggests the SSLs at a DAF of 1 are not realistic predictors of metals leaching to groundwater.

Step 7: Does the historic information and/or spatial distribution of data indicate the potential source area was sufficiently sampled?

The historical information (aerial photographs, interviews, site inspections) indicates the most likely source of CERCLA-related releases is the former boiler room in heat plant building 617. The spatial distribution of the VOC, SVOC, and inorganics data for the surface and subsurface soil samples collected during the 2010 Supplemental SI indicate the potential source area was sufficiently characterized.

5.4 Conclusions and Recommendations

Table 5-5 summarizes the results of the decision analysis for PAOC R. As shown in Table 5-5, the surface and subsurface soil data indicate the area has been sufficiently characterized.

The data also indicate there has not been a CERCLA-related release at the site that has resulted in contamination of soil at concentrations that would pose a potentially unacceptable risk to human or ecological receptors or leaching concern for groundwater. Therefore, based on the above information, no further investigation or action is warranted for PAOC R; a no action decision document will be prepared for the site.

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Table 5-1
Surface Soil Detection and Exceedance Results
PAOC R
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	**Background UTL (KTd)**	**Adjusted RSL for Residential Soil**	**Eco (E)**	**SSL (DAF=1)**	**VEPQ/R-SO02**
Sample ID					**VEPQ/R-SS02-0304-0810**
Sample Date					**08/10/10**
Chemical Name					
Volatile Organic Compounds (UG/KG)					
2-Butanone	--	2,800,000	--	1,500	26 J
Acetone	--	6,100,000	--	4,500	140
Semivolatile Organic Compounds (UG/KG)					
Benzo(a)anthracene	--	150	--	10	4.3 J
Benzo(a)pyrene	--	15	--	0.20	**4.8 J**
Benzo(b)fluoranthene	--	150	--	35	8.4 J
Benzo(k)fluoranthene	--	1,500	--	350	3.8 J
Chrysene	--	15,000	--	1,100	6.2 J
Fluoranthene	--	230,000	--	160,000	5.2 J
Indeno(1,2,3-cd)pyrene	--	150	--	120	13 J
PAH HMW (Total)	--	--	18,000	--	49 J
PAH LMW (Total)	--	--	29,000	--	5.0 J
Pyrene	--	170,000	--	120,000	8.1 J
Total Metals (MG/KG)					
Aluminum	35,000	7,700	--	55,000	20,800 J
Antimony	5.8	3.1	78	0.27	0.23 J
Arsenic	1.6	0.39	18	0.29	1.1
Barium	147	1,500	330	82	70 J
Beryllium	0.27	16	40	3.2	0.24
Cadmium	2.2	7.0	32	0.38	0.12
Calcium	8,840	--	--	--	**20,600 J**
Chromium	72	0.29	64	0.00083	14 J
Cobalt	16	2.3	13	0.49	12
Copper	66	310	70	46	57 J
Iron	38,100	5,500	--	640	27,500
Lead	5.4	400	120	27	5.4
Magnesium	3,710	--	--	--	**5,910 J**
Manganese	1,630	180	220	57	466 J
Mercury	0.057	0.78	0.10	0.002	0.020 J
Nickel	22	150	38	48	6.2 J
Potassium	5,270	--	--	--	1,630 J
Silver	0.22	39	560	1.6	0.010 J
Sodium	1,590	--	--	--	258 J
Thallium	0.13	--	1.0	0.002	0.030 J
Vanadium	144	39	130	180	82
Zinc	32	2,300	120	680	**58**

Notes:

Exceeds Background UTL
Exceeds Background UTL and SSL (DAF=1)

-- Not part of background data set (where applicable) OR Regulatory standard not promulgated
J - Analyte present, value may or may not be accurate or precise
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram

Table 5-2
Subsurface Soil Detection and Exceedance Results
PAOC R
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Station ID	Background UTL (KTd)	Adjusted RSL for Residential Soil	SSL (DAF=1)	VEPQ/R-SO02	
Sample ID				VEPQ/R-SB02-0709-0810	VEPQ/R-SB02P-0709-0810
Sample Date				08/10/10	08/10/10
Chemical Name					
Volatile Organic Compounds (UG/KG)					
Acetone	--	6,100,000	4,500	19 J	42
Semivolatile Organic Compounds (UG/KG)					
Benzo(a)anthracene	--	150	10	11 U	5.8 J
Benzo(a)pyrene	--	15	0.20	11 U	**7.8 J**
Benzo(b)fluoranthene	--	150	35	11 U	12 J
Benzo(g,h,i)perylene	--	170,000	--	11 U	5.8 J
Benzo(k)fluoranthene	--	1,500	350	11 U	5.6 J
Carbazole	--	--	--	11 U	1.6 J
Chrysene	--	15,000	1,100	11 U	8.7 J
Dibenz(a,h)anthracene	--	15	11	11 U	8.8 J
Fluoranthene	--	230,000	160,000	11 U	12 J
Indeno(1,2,3-cd)pyrene	--	150	120	11 U	17 J
Phenanthrene	--	1,700,000	--	11 U	4.4 J
Pyrene	--	170,000	120,000	11 U	12 J
Total Metals (MG/KG)					
Aluminum	35,000	7,700	55,000	**39,400 J**	**39,200 J**
Antimony	5.8	3.1	0.27	0.080 J	0.090 J
Arsenic	1.6	0.39	0.29	0.64	0.53
Barium	147	1,500	82	**224 J**	121 J
Beryllium	0.27	16	3.2	**0.34**	**0.40**
Cadmium	2.2	7.0	0.38	0.080	0.050 J
Calcium	8,840	--	--	5,370 J	6,020 J
Chromium	72	0.29	0.00083	27 J	26 J
Cobalt	16	2.3	0.49	**18**	**21**
Copper	66	310	46	**85 J**	**77 J**
Iron	38,100	5,500	640	**39,700**	**39,200**
Lead	5.4	400	27	2.0	2.0
Magnesium	3,710	--	--	**4,490 J**	**4,340 J**
Manganese	1,630	180	57	**2,360 J**	1,100 J
Mercury	0.057	0.78	0.002	0.010 J	0.010 J
Nickel	22	150	48	17 J	13 J
Potassium	5,270	--	--	1,450 J	1,480 J
Silver	0.22	39	1.6	0.032 U	0.020 J
Sodium	1,590	--	--	329 J	350 J
Thallium	0.13	--	0.002	0.050 J	0.040 J
Vanadium	144	39	180	128	116
Zinc	32	2,300	680	**34**	29

Notes:

Exceeds Background UTL
Exceeds Background UTL and Adjusted RSL for Residential Soil
Exceeds Background UTL and SSL (DAF=1)
Exceeds Background UTL, Adjusted RSL for Residential Soil and SSL (DAF=1)

-- Not part of background data set (where applicable) OR Regulatory standard not promulgated
J - Analyte present, value may or may not be accurate or precise
U - Not detected or not detected significantly greater than that in an associated blank.
MG/KG - Milligrams per kilogram
UG/KG - Micrograms per kilogram

Table 5-3
HHRA COPC Summary Table
Site Inspections/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques Island, Puerto Rico

Site: PAOC-R
Media: Surface Soil, Total Soil
Historical Function: Former Boiler Room in Heat Plant Building 617

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Frequency of Criteria Exceedance	Range of Detection Limits	Background Value KTd (1)	Max Exceeds Background KTd	November RSL Adjusted (2)		Max Exceeds 100x SL	Cancer Screening Toxicity Value (3)	Non-cancer Screening Toxicity Value (3)	95% UCL (N/T/G)	Statistic	Basis	Target Organ	Hazard Quotient	ELCR
PAOC R	7429-90-5	Aluminum	2.1E+04	J	2.1E+04	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.91E+00 - 1.91E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	--	--
Surface Soil	7440-38-2	Arsenic	1.1E+00		1.1E+00		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.00E-01 - 1.00E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	--	--
	7440-47-3	Chromium	1.4E+01	J	1.4E+01	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	5.00E-02 - 5.00E-02	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	--	--
	7440-48-4	Cobalt	1.2E+01		1.2E+01		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	--	--
	7439-89-6	Iron	2.8E+04		2.8E+04		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.50E+00 - 1.50E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	--	--
	7439-96-5	Manganese	4.7E+02	J	4.7E+02	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	9.00E-02 - 9.00E-02	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	--	--
	7440-62-2	Vanadium	8.2E+01		8.2E+01		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	7.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	--	--
PAOC R	7429-90-5	Aluminum	2.1E+04	J	3.9E+04	J	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.91E+00 - 3.54E+00	3.5E+04	Yes	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	0.5	--
Total Soil	7440-38-2	Arsenic	6.4E-01		1.1E+00		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	9.00E-02 - 1.00E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	0.05	2.8E-06
	7440-47-3	Chromium	1.4E+01	J	2.7E+01	J	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	5.00E-02 - 5.00E-02	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	0.0002	--
	7440-48-4	Cobalt	1.2E+01		2.1E+01		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.00E-02 - 1.00E-02	1.6E+01	Yes	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	0.9	5.8E-08
	7439-89-6	Iron	2.8E+04		4.0E+04		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.39E+00 - 1.50E+00	3.8E+04	Yes	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	0.7	--
	7439-96-5	Manganese	4.7E+02	J	2.4E+03	J	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	9.00E-02 - 1.60E-01	1.6E+03	Yes	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	1.3	--
	7440-62-2	Vanadium	8.2E+01		1.3E+02		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	6.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	0.3	--

Note:
(1) East Vieques Soil Type KTd
(2) Regional Screening Levels for Residential Soil (November 2010). Concentrations based on non-carcinogenic health effects are adjusted using HQ=0.1.
(3) Regional Screening Levels for Residential Soil (November 2010) based on an ELCR of $1x10^{6}$ and an HQ=1.0

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

ca = Carcinogenic
nc = Noncarcinogenic
J = compound was detected below the reporting limit in the sample
ELCR = Excess Lifetime Cancer Risk
CNS = Central nervous System

Site Cumulative Risk	Max HI *	ELCR
Soil	1.8	3E-06
Total Risk	1.8	3E-06

* - Max HI is the highest HI associated with any target organ or critical effect and is based on CNS.

Table 5-4
HHRA COPC Summary Table Supplement
Site Inspection/Expanded Site Inspection Report Addendum
PI 7, PAOC Q, and PAOC R
Vieques Island, Puerto Rico

Site: PAOC-R
Media: Surface Soil, Total Soil
Historical Function: Former Boiler Room in Heat Plant Building 617

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Frequency of Criteria Exceedance	Range of Detection Limits	Background Value KTd (1)	Max Exceeds Background KTd	November RSL Adjusted (2)		Max Exceeds 100x SL	Cancer Screening Toxicity Value (3)	Non-cancer Screening Toxicity Value (3)	95% UCL (N/T/G)	Statistic	Basis	Target Organ	Hazard Quotient	ELCR
PAOC R	7429-90-5	Aluminum	2.1E+04	J	2.1E+04	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.91E+00 - 1.91E+00	3.5E+04	No	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	--	--
Surface Soil	7440-38-2	Arsenic	1.1E+00		1.1E+00		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.00E-01 - 1.00E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	--	--
	7440-47-3	Chromium	1.4E+01	J	1.4E+01	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	5.00E-02 - 5.00E-02	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	--	--
	7440-48-4	Cobalt	1.2E+01		1.2E+01		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.00E-02 - 1.00E-02	1.6E+01	No	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	--	--
	7439-89-6	Iron	2.8E+04		2.8E+04		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	1.50E+00 - 1.50E+00	3.8E+04	No	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	--	--
	7439-96-5	Manganese	4.7E+02	J	4.7E+02	J	mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	9.00E-02 - 9.00E-02	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	--	--
	7440-62-2	Vanadium	8.2E+01		8.2E+01		mg/kg	VEPQ/R-SO02	1 / 1	1 / 1	7.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	--	--
PAOC R	7429-90-5	Aluminum	2.1E+04	J	3.9E+04	J	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.91E+00 - 3.54E+00	3.5E+04	Yes	7.7E+03	nc	No	--	7.7E+04	--	--	Max	CNS	0.5	--
Total Soil	7440-38-2	Arsenic	6.4E-01		1.1E+00		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	9.00E-02 - 1.00E-01	1.6E+00	No	3.9E-01	ca	No	3.9E-01	2.2E+01	--	--	Max	Hyperpigmentation, keratosis and possible vascular complications	0.05	2.8E-06
	7440-47-3	Chromium	1.4E+01	J	2.7E+01	J	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	5.00E-02 - 5.00E-02	7.2E+01	No	2.9E-01	ca	No	--	1.2E+05	--	--	Max	No Observed Effects	0.0002	--
	7440-48-4	Cobalt	1.2E+01		2.1E+01		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.00E-02 - 1.00E-02	1.6E+01	Yes	2.3E+00	nc	No	3.7E+02	2.3E+01	--	--	Max	decreased iodine uptake	0.9	5.8E-08
	7439-89-6	Iron	2.8E+04		4.0E+04		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	1.39E+00 - 1.50E+00	3.8E+04	Yes	5.5E+03	nc	No	--	5.5E+04	--	--	Max	gastrointestinal effects	0.7	--
	7439-96-5	Manganese	4.7E+02	J	1.1E+03	(4)	mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	9.00E-02 - 1.60E-01	1.6E+03	No	1.8E+02	nc	No	--	1.8E+03	--	--	Max	CNS	0.6	--
	7440-62-2	Vanadium	8.2E+01		1.3E+02		mg/kg	VEPQ/R-SO02	2 / 2	2 / 2	6.00E-02 - 7.00E-02	1.4E+02	No	3.9E+01	nc	No	--	3.9E+02	--	--	Max	decreased hair cystine	0.3	--

Note:
(1) East Vieques Soil Type KTd
(2) Regional Screening Levels for Residential Soil (November 2010). Concentrations based on non-carcinogenic health effects are adjusted using HQ=0.1.
(3) Regional Screening Levels for Residential Soil (November 2010) based on an ELCR of $1x10^{-6}$ and an HQ=1.0
(4) A pair of normal and duplicate samples was collected at the location of the maximum detected concentration. The manganese concentration in the duplicate sample was used in this table for comparison purposes. The manganese data associated with the normal sample is presented in Table 3-3.

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

ca = Carcinogenic
nc = Noncarcinogenic
J = compound was detected below the reporting limit in the sample
ELCR = Excess Lifetime Cancer Risk
CNS = Central nervous System

Site Cumulative Risk	Max HI *	ELCR
Soil	1.1	3E-06
Total Risk	1.1	3E-06

* - Max HI is the highest HI associated with any target organ or critical effect and is based on CNS.

Table 5-5
Decision Tree Summary
PAOC R - Former Boiler Room in Heat Plant Building 617
Site Inspection/Expanded Site Inspection Addendum Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 2 Data Quality Acceptable?	Step 3 Inorganics Above Background or Non-inorganics Detected?	Step 4 Potentially Attributable to CERCLA Release?	Step 5 Exceedances of Comparison Criteria?	Step 6 More Realistic Evaluation?	Step 7 Medium Sufficiently Characterized?
Surface Soil (Supplemental SI)	Yes	Yes	VOCs	Yes	No	N/A	Medium sufficiently characterized; no further investigation or action for medium
			SVOCs	Yes	B(a)P > SSL	not detected in downgradient groundwater	
			Inorganics	Yes	No	N/A	
Subsurface Soil (Supplemental SI)	Yes	Yes	VOCs	Yes	No	N/A	Medium sufficiently characterized; no further investigation or action for medium
			SVOCs	Yes	B(a)P > SSL	not detected in downgradient groundwater	
			Inorganics	Yes	Al > RSL, BKG	acceptable HH risk level	
					Ba > SSL, BKG	detected in downgradient groundwater below MCL and tap water RSL; < SSL at a DAF of 3	
					Co > RSL, SSL, BKG	acceptable HH risk level; detected in downgradient groundwater below tap water RSL	
					Cu > SSL, BKG	detected in downgradient groundwater below MCL and tap water RSL; < SSL at a DAF of 2	
					Fe > RSL, SSL, BKG	acceptable HH risk level; detected in downgradient groundwater below tap water RSL	
					Mn > RSL, SSL, BKG	slightly above acceptable HH risk level in initial sample; acceptable HH risk level in duplicate sample; mean concentration similar to background; Mn not likely associated with a release from boiler; most common anthropogenic source of manganese is steel; detected in downgradient groundwater below tap water RSL	

Legend

- Camp Garcia Area
- SI Surface Soil Sample Location
- Supplemental SI Surface and Subsurface Soil Sampling Location

FIGURE 5-1
PAOC R Soil Sample Locations
1983 Aerial Photograph
Site Inspection/Expanded Site Inspection Report Addendum, PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

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SECTION 6

Summary of Conclusions and Recommendations

Table 6-1 summarizes the historical information, data collection, findings, conclusions, and recommendations for each of the 3 sites investigated during the Supplemental SI/ESI. As shown in the table, the following is recommended for each of the sites:

No Action/No Further Action (Preparation of a No Action/No Further Action Decision Document)

- PI 7
- PAOC Q
- PAOC R

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Table 6-1
Summary of Conclusions and Recommendations
Site Inspection/Expanded Site Inspection Addendum Report
PI 7, PAOC Q, and PAOC R
Vieques, Puerto Rico

Site Name	Site Description	Site History	Potential Source(s)	Potential Release Mechanism(s)	Site-specific Data Collected	Results of 7-step Decision Analysis	Conclusions	Recommendations
PI 7 (Central Subsection in PI7-3 Vicinity)	Former Quarry	Defunct rock quarry	Miscellaneous debris, including drum	Spills or leaks to the ground surface	5 co-located surface soil and subsurface soil samples and 6 additional surface soil samples	Data suggest potential source area was sufficiently characterized	Supplemental ESI data indicate historical PAH data for PI7-3 are not representative of current conditions; no SVOCs detected in Supplemental ESI samples; the results indicate that there has not been a CERCLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document
PAOC Q	Former Boiler Room in Heat Plant Building 607	Boiler room in building constructed in 1963 and demolished in 1984	Boilers	Spills or leaks to ground surface	1 co-located surface and subsurface soil samples and 1 additional surface soil sample	Data suggest potential source area was sufficiently characterized	SI (2009) surface soil sample was collected from cover material placed by USFWS during road improvement activities; therefore SI subsurface soil sample was deemed representative of historical surface soil, and a co-located suface soil and subsurface soil sample was collected during the Supplemental SI; the results indicate that there has not been a CERLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document
PAOC R	Former Boiler Room in Heat Plant Building 617	Boiler rooms in building constructed in 1970 and demolished in 1984	Boilers	Spills or leaks to ground surface	1 co-located surface and subsurface soil sample	Data suggest potential source area was sufficiently characterized	SI (2009) surface soil sample was collected from cover material placed by USFWS during road improvement activities (no subsurface soil sample was collected due to refusal); therefore, a co-located suface soil and subsurface soil sample was collected during the Supplemental SI/ESI; the results indicate that there has not been a CERCLA-related release that has resulted in contamination of soil at concentrations posing potentially unacceptable risks to human or ecological receptors or leaching concerns for groundwater	No further investigation or action; prepare a no action decision document

SECTION 7

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Appendix A
Soil Boring Logs

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CH2MHILL	PROJECT NUMBER 404422.FI.FK.47	BORING NUMBER PI07-SS/SB42-0810	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : CTO-111 LOCATION : PI-7

ELEVATION: -- DRILLING CONTRACTOR : ERTEC

DRILLING METHOD AND EQUIPMENT USED : Slide hammer with tripod and 2.0' split spoon sampler

WATER LEVELS : -- START : 08/17/10 0810 END : 08/17/10 0940 LOGGER : D. Whitaker

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/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 - 1.5'	1.4'	SH-1		0 - 0.5' bgs TOP SOIL (CL 10H), dark brown (10YR 3/3), poorly graded fine sand, loose, organics 0.5 - 1.4' bgs GRAVEL (GW), light brownish gray (10YR 6/2), well graded gravel with sand, loose, subangular gravel, fine to coarse sand	0.0 / 0.0 / 0.0 0.0 / 0.0 / 0.0 0.0 / 0.0 / 0.0
2.5					Refusal at 1.5' bgs 5 times (See Logbook)	0825: PI07-SS42-0810 (Composite Sample for SVOCs) collected from 0-1' bgs 0915: PI07-SB42-0810 (Composite Sample for SVOCs) from 1.0 -
5						
7.5						
10						

Sampler Signature: **D. Whitaker** Date: **8/17/2010**

CH2MHILL	PROJECT NUMBER 404422.FI.FK.47	BORING NUMBER VEPQ/R-SS/SB01-0810	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : CTO-111 LOCATION : PAOC Q/R

ELEVATION: -- DRILLING CONTRACTOR : ERTEC

DRILLING METHOD AND EQUIPMENT USED : Slide hammer with tripod and 2.0' split spoon sampler

WATER LEVELS : -- START : 08-11-10 0900 END : 08-11-10 1120 LOGGER : D. Whitaker

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/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 - 2'	0.5'	SH-1		0 - 0.5' bgs SAND WITH SILT (SW-SM), dark brown (10YR 3/3), well graded sand, moist, loose, fine to coarse sand with ~10% silt and ~20% gravel	0.0 0.0
2.5	2 - 4'	1.3'	SH-2		2.0 - 2.2' bgs SAND WITH SILT (SW-SM), dark brown (10YR 3/3), well graded sand, moist, loose, fine to coarse sand with ~10% silt and ~20% gravel 2.2 - 3.3' bgs SAND (SW), brown (10YR 4/3), well graded sand, very loose, moist, ~10% gravel, appears to be fill material	0.0 0.0
5	4 - 6'	1.0'	SH-3		4.0 - 4.2' bgs SAND (SW), brown (10YR 4/3), well graded sand, dry, very loose, natural organics within this interval, appears to be old topsoil layer 4.2 - 5.0' bgs SILT WITH FINE SAND (ML), dark brown (10YR 3/3), stiff, dry, low plasticity	0.0 0.0
7.5	6 - 8'	0.6'	SH-4		6.0 - 6.6' bgs SILT WITH FINE SAND (ML), dark brown (10YR 3/3), stiff, dry, low plasticity	0.0 0.0
10	8 - 10'	2.0'	SH-5		8.0 - 10.0' bgs SAND WITH SILT (SP-SM), brown (7.5YR 4/3), poorly graded sand, low plasticity, dry, fine to very fine sand with ~10% silt	0.0 0.0
					10 feet - END of Boring	0930: VEPQ/R-SS01-0810 (Surface Soil Sample) collected as encores from 4.6 - 5.0' bgs and composite samples from 4.0 - 5.0' bgs with an MS/MSD 1000: VEPQ/R-SB01-0810 (Subsurface Soil Sample) collected as encores from 8.5 - 9.0' bgs and composite samples from 8.0 - 10.0' bgs

Sampler Signature: **D. Whitaker** Date: **8/11/2010**

CH2MHILL	PROJECT NUMBER 404422.FI.FK.47	BORING NUMBER VEPQ/R-SS/SB02-0810	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : CTO-111 LOCATION : PAOC Q/R

ELEVATION: -- DRILLING CONTRACTOR : ERTEC

DRILLING METHOD AND EQUIPMENT USED : Slide hammer with tripod and 2.0' split spoon sampler

WATER LEVELS : -- START : 08-10-10 0900 END : 08-10-10 1145 LOGGER : D. Whitaker

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/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 - 2'	--	SH-1			Close tip 0-2' bgs - No Recovery
2.5	2 - 4'	1.5'	SH-2		2.0 - 3.0' bgs GRAVEL WITH SAND, brown sand (10YR 4/5), loose gravel fine to coarse, fill material 3.0 - 3.05' bgs Native trace surface organics/topsoil 3.05 - 3.5' bgs SAND (SW), dark yellowish brown (10YR 4/4), well graded sand with trace clay, fine to coarse sand, moist, no plasticity	0.0 At 3.0' bgs 0.0 At 3.25' bgs
5	4 - 6'	0.5'	SH-3		4.0 - 4.5' bgs SAND (SW), dark yellowish brow (10YR 4/4), well graded, loose, moist, fine to coarse sand	0.0 At 4.1' bgs
7.5	6 - 8'	1.2'	SH-4		6.0 - 6.5' bgs SAND (SW), very dark grayish brown (10YR 3/3), well graded, loose, fine to coarse sand with little angular gravel, dry 6.5 - 6.6' bgs Angular gravel layer 6.6 - 7.2' bgs SAND (SP), very dark grayish brown (10YR 3/2), poorly graded	0.0 At 6.1' bgs 0.0 At 6.4' bgs 0.0 At 6.7' bgs 0.0 At 7.1' bgs
10	8 - 10'	1.5'	SH-5		8.0 - 10.0' bgs Hit refusal on rock. No recovery. Try again to get recovery. 8.0 - 9.5' bgs SAND (SP), very dark grayish brown (10YR 3/2), poorly graded, with trace fine angular gravel, dry to moist, dense	0.0 At 8.0' bgs 0.0 At 8.4' bgs 0.0 At 8.7' bgs 0.0 At 9.0' bgs 0.0 At 9.2' bgs 0.0 At 9.4' bgs
					10 feet - END of Boring	1000: VEPQ/R-SS02-0810 (Surface Soil Sample) collected as encores from 3.1 - 3.5' bgs and composite samples from 3.0 - 3.5' and 4.0 - 4.5' bgs 1020: VEPQ/R-SB02-0810 (Subsurface Soil Sample) and Duplicate (1025) collected as encores from 6.9 - 7.2' bgs and samples from 6.0 - 7.2' and 8.0 - 9.0' bgs

Sampler Signature: **D. Whitaker** Date: **8/10/2010**

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Appendix B
Analytical Data Summary

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Vieques East
PAOC Q
Final Subsurface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SB01-0810-0810
Sample Date	08/11/10
Chemical Name	
Volatile Organic Compounds (UG/KG)	
1,1,1-Trichloroethane	2.5 U
1,1,2,2-Tetrachloroethane	2.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	2.5 U
1,1,2-Trichloroethane	2.5 U
1,1-Dichloroethane	2.5 U
1,1-Dichloroethene	2.5 U
1,2,3-Trichlorobenzene	2.5 U
1,2,4-Trichlorobenzene	2.5 U
1,2-Dibromo-3-chloropropane	2.5 U
1,2-Dibromoethane	2.5 U
1,2-Dichlorobenzene	2.5 U
1,2-Dichloroethane	2.5 U
1,2-Dichloropropane	2.5 U
1,3-Dichlorobenzene	2.5 U
1,4-Dichlorobenzene	2.5 U
2-Butanone	12 U
2-Hexanone	12 U
4-Methyl-2-pentanone	12 U
Acetone	34
Benzene	2.5 U
Bromochloromethane	2.5 U
Bromodichloromethane	2.5 U
Bromoform	2.5 U
Bromomethane	5 UJ
Carbon disulfide	2.5 U
Carbon tetrachloride	2.5 U
Chlorobenzene	2.5 U
Chloroethane	5 U
Chloroform	2.5 U
Chloromethane	5 U
cis-1,2-Dichloroethene	2.5 U
cis-1,3-Dichloropropene	2.5 U
Cyclohexane	2.5 U
Dibromochloromethane	2.5 U
Dichlorodifluoromethane (Freon-12)	5 U
Ethylbenzene	2.5 U
Isopropylbenzene	2.5 U
m- and p-Xylene	5 U
Methyl acetate	3 U
Methylcyclohexane	2.5 U
Methylene chloride	12 U
Methyl-tert-butyl ether (MTBE)	2.5 U
o-Xylene	2.5 U
Styrene	2.5 U
Tetrachloroethene	2.5 U
Toluene	2.5 U
trans-1,2-Dichloroethene	2.5 U
trans-1,3-Dichloropropene	2.5 U
Trichloroethene	2.5 U
Trichlorofluoromethane (Freon-11)	5 U
Vinyl chloride	5 U
Semivolatile Organic Compounds (UG/KG)	
1,1-Biphenyl	260 U
1,2,4,5-Tetrachlorobenzene	260 U
1,4-Dioxane	53 U
2,2'-Oxybis(1-chloropropane)	260 U
2,3,4,6-Tetrachlorophenol	260 U
2,4,5-Trichlorophenol	660 U
2,4,6-Trichlorophenol	260 U
2,4-Dichlorophenol	260 U
2,4-Dimethylphenol	260 U

Vieques East
PAOC Q
Final Subsurface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SB01-0810-0810
Sample Date	08/11/10
Chemical Name	
2,4-Dinitrophenol	660 U
2,4-Dinitrotoluene	260 U
2,6-Dinitrotoluene	260 U
2-Chloronaphthalene	11 U
2-Chlorophenol	260 U
2-Methylnaphthalene	11 U
2-Methylphenol	260 U
2-Nitroaniline	660 U
2-Nitrophenol	260 U
3- and 4-Methylphenol	260 U
3,3'-Dichlorobenzidine	260 U
3-Nitroaniline	660 U
4,6-Dinitro-2-methylphenol	660 U
4-Bromophenyl-phenylether	260 U
4-Chloro-3-methylphenol	260 U
4-Chloroaniline	260 U
4-Chlorophenyl-phenylether	260 U
4-Nitroaniline	660 U
4-Nitrophenol	660 U
Acenaphthene	11 U
Acenaphthylene	11 U
Acetophenone	260 U
Anthracene	11 U
Atrazine	260 U
Benzaldehyde	260 U
Benzo(a)anthracene	11 U
Benzo(a)pyrene	11 U
Benzo(b)fluoranthene	11 U
Benzo(g,h,i)perylene	11 U
Benzo(k)fluoranthene	11 U
bis(2-Chloroethoxy)methane	260 U
bis(2-Chloroethyl)ether	260 U
bis(2-Ethylhexyl)phthalate	91 U
Butylbenzylphthalate	260 U
Caprolactam	260 U
Carbazole	11 U
Chrysene	11 U
Dibenz(a,h)anthracene	11 U
Dibenzofuran	260 U
Diethylphthalate	260 U
Dimethyl phthalate	260 U
Di-n-butylphthalate	53 U
Di-n-octylphthalate	260 U
Fluoranthene	11 U
Fluorene	11 U
Hexachlorobenzene	11 U
Hexachlorobutadiene	260 U
Hexachlorocyclopentadiene	260 U
Hexachloroethane	11 U
Indeno(1,2,3-cd)pyrene	11 U
Isophorone	260 U
Naphthalene	11 U
n-Nitroso-di-n-propylamine	260 U
n-Nitrosodiphenylamine	260 U
Nitrobenzene	260 U
Pentachlorophenol	53 U
Phenanthrene	11 U
Phenol	260 U
Pyrene	11 U
Total Metals (MG/KG)	
Aluminum	20,600 J
Antimony	0.045 U
Arsenic	0.49

Vieques East
PAOC Q
Final Subsurface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SB01-0810-0810
Sample Date	08/11/10
Chemical Name	
Barium	103 J
Beryllium	0.22
Cadmium	0.06 J
Calcium	14,100 J
Chromium	20.8 J
Cobalt	12.1
Copper	65.9 J
Cyanide	0.44 U
Iron	30,800
Lead	1.5
Magnesium	5,160 J
Manganese	789 J
Mercury	0.017 U
Nickel	9 J
Potassium	1,540 J
Selenium	0.27 U
Silver	0.036 U
Sodium	402 J
Thallium	0.03 J
Vanadium	127
Zinc	32.6
Wet Chemistry	
% Solids (pct)	86
pH (ph)	7.8
Total organic carbon (TOC) (ug/g)	1,100
Geotechnical (G/CC)	
Density	1.34
Grain Size (PCT)	
Clay (%)	30.5
Coarse Sand (%)	1.3
Fine Sand (%)	20.3
Gravel (%)	4.1
GRAINSIZE (PCT/P)	
GS03 Sieve 3" (75 mm)	100
GS05 Sieve 2" (50 mm)	100
GS06 Sieve 1.5" (37.5 mm)	100
GS07 Sieve 1" (25.0 mm)	100
GS08 Sieve 0.75" (19.0 mm)	100
GS10 Sieve 0.375" (9.5 mm)	96.2
GRAINSIZE (MM)	
Hyd1 - Particle Diam. (mm)	0.0314
GRAINSIZE (PCT/P)	
Hyd1 - Percent Passing (%)	44.8
GRAINSIZE (MM)	
Hyd2 - Particle Diam. (mm)	0.0203
GRAINSIZE (PCT/P)	
Hyd2 - Percent Passing (%)	39.1
GRAINSIZE (MM)	
Hyd3 - Particle Diam. (mm)	0.0119
GRAINSIZE (PCT/P)	
Hyd3 - Percent Passing (%)	36.3
GRAINSIZE (MM)	
Hyd4 - Particle Diam. (mm)	0.0087
GRAINSIZE (PCT/P)	
Hyd4 - Percent Passing (%)	33.3
GRAINSIZE (MM)	
Hyd5 - Particle Diam. (mm)	0.0062
GRAINSIZE (PCT/P)	
Hyd5 - Percent Passing (%)	30.5
GRAINSIZE (MM)	
Hyd6 - Particle Diam. (mm)	0.0031

Vieques East
PAOC Q
Final Subsurface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SB01-0810-0810
Sample Date	08/11/10
Chemical Name	
GRAINSIZE (PCT/P)	
Hyd6 - Percent Passing (%)	27.2
GRAINSIZE (MM)	
Hyd7 - Particle Diam. (mm)	0.0013
GRAINSIZE (PCT/P)	
Hyd7 - Percent Passing (%)	21.6
GRAINSIZE (PCT)	
Medium Sand (%)	11.1
Sand (%)	32.7
GRAINSIZE (PCT/P)	
Sieve No. 004 (4.75 mm)	95.9
Sieve No. 010 (2.00 mm)	94.6
Sieve No. 020 (850 um)	90.3
Sieve No. 040 (425 um)	83.5
Sieve No. 060 (250 um)	77.2
Sieve No. 080 (180 um)	73.3
Sieve No. 100 (150 um)	71.4
Sieve No. 200 (75 um)	63.2
GRAINSIZE (PCT)	
Silt (%)	32.7

Notes:

Shading indicates detections

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/G - Micrograms per gram

UG/KG - Micrograms per kilogram

Vieques East
PAOC Q
Final Surface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SS01-0405-0810
Sample Date	08/11/10
Chemical Name	
Volatile Organic Compounds (UG/KG)	
1,1,1-Trichloroethane	2.5 U
1,1,2,2-Tetrachloroethane	2.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	2.5 U
1,1,2-Trichloroethane	2.5 U
1,1-Dichloroethane	2.5 U
1,1-Dichloroethene	2.5 U
1,2,3-Trichlorobenzene	2.5 U
1,2,4-Trichlorobenzene	2.5 U
1,2-Dibromo-3-chloropropane	2.5 U
1,2-Dibromoethane	2.5 U
1,2-Dichlorobenzene	2.5 U
1,2-Dichloroethane	2.5 U
1,2-Dichloropropane	2.5 U
1,3-Dichlorobenzene	2.5 U
1,4-Dichlorobenzene	2.5 U
2-Butanone	12 U
2-Hexanone	12 U
4-Methyl-2-pentanone	12 U
Acetone	7.3 J
Benzene	2.5 U
Bromochloromethane	2.5 U
Bromodichloromethane	2.5 U
Bromoform	2.5 U
Bromomethane	5 U
Carbon disulfide	2.5 U
Carbon tetrachloride	2.5 U
Chlorobenzene	2.5 U
Chloroethane	5 U
Chloroform	2.5 U
Chloromethane	5 U
cis-1,2-Dichloroethene	2.5 U
cis-1,3-Dichloropropene	2.5 U
Cyclohexane	2.5 U
Dibromochloromethane	2.5 U
Dichlorodifluoromethane (Freon-12)	5 U
Ethylbenzene	2.5 U
Isopropylbenzene	2.5 U
m- and p-Xylene	5 U
Methyl acetate	3 U
Methylcyclohexane	2.5 U
Methylene chloride	12 U
Methyl-tert-butyl ether (MTBE)	2.5 U
o-Xylene	2.5 U
Styrene	2.5 U
Tetrachloroethene	2.5 U
Toluene	1.9 J
trans-1,2-Dichloroethene	2.5 U
trans-1,3-Dichloropropene	2.5 U
Trichloroethene	2.5 U
Trichlorofluoromethane (Freon-11)	5 U
Vinyl chloride	5 U
Semivolatile Organic Compounds (UG/KG)	
1,1-Biphenyl	280 U
1,2,4,5-Tetrachlorobenzene	280 U
1,4-Dioxane	57 U
2,2'-Oxybis(1-chloropropane)	280 U
2,3,4,6-Tetrachlorophenol	280 U
2,4,5-Trichlorophenol	700 U
2,4,6-Trichlorophenol	280 U
2,4-Dichlorophenol	280 U
2,4-Dimethylphenol	280 U
2,4-Dinitrophenol	700 U

Vieques East
PAOC Q
Final Surface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SS01-0405-0810
Sample Date	08/11/10
Chemical Name	
2,4-Dinitrotoluene	280 U
2,6-Dinitrotoluene	280 U
2-Chloronaphthalene	11 U
2-Chlorophenol	280 U
2-Methylnaphthalene	11 U
2-Methylphenol	280 U
2-Nitroaniline	700 U
2-Nitrophenol	280 U
3- and 4-Methylphenol	280 U
3,3'-Dichlorobenzidine	280 U
3-Nitroaniline	700 U
4,6-Dinitro-2-methylphenol	700 U
4-Bromophenyl-phenylether	280 U
4-Chloro-3-methylphenol	280 U
4-Chloroaniline	280 U
4-Chlorophenyl-phenylether	280 U
4-Nitroaniline	700 U
4-Nitrophenol	700 U
Acenaphthene	11 U
Acenaphthylene	11 U
Acetophenone	280 U
Anthracene	11 U
Atrazine	280 U
Benzaldehyde	280 U
Benzo(a)anthracene	11 U
Benzo(a)pyrene	11 U
Benzo(b)fluoranthene	11 U
Benzo(g,h,i)perylene	11 U
Benzo(k)fluoranthene	11 U
bis(2-Chloroethoxy)methane	280 U
bis(2-Chloroethyl)ether	280 U
bis(2-Ethylhexyl)phthalate	57 U
Butylbenzylphthalate	280 U
Caprolactam	280 U
Carbazole	11 U
Chrysene	11 U
Dibenz(a,h)anthracene	7.7 J
Dibenzofuran	280 U
Diethylphthalate	280 U
Dimethyl phthalate	280 U
Di-n-butylphthalate	57 U
Di-n-octylphthalate	280 U
Fluoranthene	11 U
Fluorene	11 U
Hexachlorobenzene	11 U
Hexachlorobutadiene	280 U
Hexachlorocyclopentadiene	280 U
Hexachloroethane	11 U
Indeno(1,2,3-cd)pyrene	11 J
Isophorone	280 U
Naphthalene	11 U
n-Nitroso-di-n-propylamine	280 U
n-Nitrosodiphenylamine	280 U
Nitrobenzene	280 U
Pentachlorophenol	57 U
Phenanthrene	11 U
Phenol	280 U
Pyrene	11 U
Total Metals (MG/KG)	
Aluminum	33,800 J
Antimony	0.62 J
Arsenic	0.99
Barium	81.4 J
Beryllium	0.37

Vieques East
PAOC Q
Final Surface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SS01-0405-0810
Sample Date	08/11/10
Chemical Name	
Cadmium	0.03 J
Calcium	6,500 J
Chromium	16.1 J
Cobalt	11.7
Copper	52 J
Cyanide	0.48 U
Iron	35,300
Lead	2.1
Magnesium	4,980 J
Manganese	551 J
Mercury	0.02 U
Nickel	7.1 J
Potassium	1,310 J
Selenium	0.43 U
Silver	0.02 J
Sodium	394 J
Thallium	0.04 J
Vanadium	114
Zinc	28.1
Wet Chemistry	
% Solids (pct)	84
pH (ph)	7.8
Total organic carbon (TOC) (ug/g)	4,000
Geotechnical (G/CC)	
Density	1.33
Grain Size (PCT)	
Clay (%)	25.6
Coarse Sand (%)	1.9
Fine Sand (%)	26.1
Gravel (%)	5.7
GRAINSIZE (PCT/P)	
GS03 Sieve 3" (75 mm)	100
GS05 Sieve 2" (50 mm)	100
GS06 Sieve 1.5" (37.5 mm)	100
GS07 Sieve 1" (25.0 mm)	100
GS08 Sieve 0.75" (19.0 mm)	100
GS10 Sieve 0.375" (9.5 mm)	94.3
GRAINSIZE (MM)	
Hyd1 - Particle Diam. (mm)	0.0327
GRAINSIZE (PCT/P)	
Hyd1 - Percent Passing (%)	36.3
GRAINSIZE (MM)	
Hyd2 - Particle Diam. (mm)	0.021
GRAINSIZE (PCT/P)	
Hyd2 - Percent Passing (%)	31.9
GRAINSIZE (MM)	
Hyd3 - Particle Diam. (mm)	0.0123
GRAINSIZE (PCT/P)	
Hyd3 - Percent Passing (%)	28.7
GRAINSIZE (MM)	
Hyd4 - Particle Diam. (mm)	0.0088
GRAINSIZE (PCT/P)	
Hyd4 - Percent Passing (%)	27.3
GRAINSIZE (MM)	
Hyd5 - Particle Diam. (mm)	0.0063
GRAINSIZE (PCT/P)	
Hyd5 - Percent Passing (%)	25.6
GRAINSIZE (MM)	
Hyd6 - Particle Diam. (mm)	0.0031
GRAINSIZE (PCT/P)	
Hyd6 - Percent Passing (%)	22.1
GRAINSIZE (MM)	

Vieques East
PAOC Q
Final Surface Soil Raw Analytical Data
August 2010

Station ID	VEPQ/R-SO01
Sample ID	VEPQ_R-SS01-0405-0810
Sample Date	08/11/10
Chemical Name	
Hyd7 - Particle Diam. (mm)	0.0013
GRAINSIZE (PCT/P)	
Hyd7 - Percent Passing (%)	19.5
GRAINSIZE (PCT)	
Medium Sand (%)	16.6
Sand (%)	44.6
GRAINSIZE (PCT/P)	
Sieve No. 004 (4.75 mm)	94.3
Sieve No. 010 (2.00 mm)	92.4
Sieve No. 020 (850 um)	85.3
Sieve No. 040 (425 um)	75.8
Sieve No. 060 (250 um)	67.8
Sieve No. 080 (180 um)	63.1
Sieve No. 100 (150 um)	60.7
Sieve No. 200 (75 um)	49.7
GRAINSIZE (PCT)	
Silt (%)	24.1

Notes:

Shading indicates detections

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

U - The material was analyzed for, but not detected

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

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Station ID	VEPQ/R-SO02	
Sample ID	VEPQ_R-SB02-0709-0810	VEPQ_R-SB02P-0709-0810
Sample Date	08/10/10	08/10/10
Chemical Name		
Volatile Organic Compounds (UG/KG)		
1,1,1-Trichloroethane	2.8 U	3 U
1,1,2,2-Tetrachloroethane	2.8 U	3 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	2.8 U	3 U
1,1,2-Trichloroethane	2.8 U	3 U
1,1-Dichloroethane	2.8 U	3 U
1,1-Dichloroethene	2.8 U	3 U
1,2,3-Trichlorobenzene	2.8 U	3 U
1,2,4-Trichlorobenzene	2.8 U	3 U
1,2-Dibromo-3-chloropropane	2.8 U	3 U
1,2-Dibromoethane	2.8 U	3 U
1,2-Dichlorobenzene	2.8 U	3 U
1,2-Dichloroethane	2.8 U	3 U
1,2-Dichloropropane	2.8 U	3 U
1,3-Dichlorobenzene	2.8 U	3 U
1,4-Dichlorobenzene	2.8 U	3 U
2-Butanone	14 U	15 U
2-Hexanone	14 U	15 U
4-Methyl-2-pentanone	14 U	15 U
Acetone	19 J	42
Benzene	2.8 U	3 U
Bromochloromethane	2.8 U	3 U
Bromodichloromethane	2.8 U	3 U
Bromoform	2.8 U	3 U
Bromomethane	5.5 U	6 U
Carbon disulfide	2.8 U	3 U
Carbon tetrachloride	2.8 U	3 U
Chlorobenzene	2.8 U	3 U
Chloroethane	5.5 U	6 U
Chloroform	2.8 U	3 U
Chloromethane	5.5 U	6 U
cis-1,2-Dichloroethene	2.8 U	3 U
cis-1,3-Dichloropropene	2.8 U	3 U
Cyclohexane	2.8 U	3 U
Dibromochloromethane	2.8 U	3 U
Dichlorodifluoromethane (Freon-12)	5.5 U	6 U
Ethylbenzene	2.8 U	3 U
Isopropylbenzene	2.8 U	3 U
m- and p-Xylene	5.5 U	6 U
Methyl acetate	3.3 U	3.6 U
Methylcyclohexane	2.8 U	3 U
Methylene chloride	14 U	15 U
Methyl-tert-butyl ether (MTBE)	2.8 U	3 U
o-Xylene	2.8 U	3 U
Styrene	2.8 U	3 U
Tetrachloroethene	2.8 U	3 U
Toluene	2.8 U	3 U
trans-1,2-Dichloroethene	2.8 U	3 U
trans-1,3-Dichloropropene	2.8 U	3 U
Trichloroethene	2.8 U	3 U
Trichlorofluoromethane (Freon-11)	5.5 U	6 U
Vinyl chloride	5.5 U	6 U
Semivolatile Organic Compounds (UG/KG)		
1,1-Biphenyl	270 U	300 U
1,2,4,5-Tetrachlorobenzene	270 U	300 U
1,4-Dioxane	55 U	60 U
2,2'-Oxybis(1-chloropropane)	270 U	300 U
2,3,4,6-Tetrachlorophenol	270 U	300 U
2,4,5-Trichlorophenol	680 U	730 U
2,4,6-Trichlorophenol	270 U	300 U
2,4-Dichlorophenol	270 U	300 U
2,4-Dimethylphenol	270 U	300 U
2,4-Dinitrophenol	680 U	730 U
2,4-Dinitrotoluene	270 U	300 U
2,6-Dinitrotoluene	270 U	300 U
2-Chloronaphthalene	11 U	12 U
2-Chlorophenol	270 U	300 U
2-Methylnaphthalene	11 U	12 U

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Station ID	VEPQ/R-SO02	
Sample ID	VEPQ_R-SB02-0709-0810	VEPQ_R-SB02P-0709-0810
Sample Date	08/10/10	08/10/10
Chemical Name		
2-Methylphenol	270 U	300 U
2-Nitroaniline	680 U	730 U
2-Nitrophenol	270 U	300 U
3- and 4-Methylphenol	270 U	300 U
3,3'-Dichlorobenzidine	270 U	300 U
3-Nitroaniline	680 U	730 U
4,6-Dinitro-2-methylphenol	680 U	730 U
4-Bromophenyl-phenylether	270 U	300 U
4-Chloro-3-methylphenol	270 U	300 U
4-Chloroaniline	270 U	300 U
4-Chlorophenyl-phenylether	270 U	300 U
4-Nitroaniline	680 U	730 U
4-Nitrophenol	680 U	730 U
Acenaphthene	11 U	12 U
Acenaphthylene	11 U	12 U
Acetophenone	270 U	300 U
Anthracene	11 U	12 U
Atrazine	270 U	300 U
Benzaldehyde	270 R	300 R
Benzo(a)anthracene	11 U	5.8 J
Benzo(a)pyrene	11 U	7.8 J
Benzo(b)fluoranthene	11 U	12 J
Benzo(g,h,i)perylene	11 U	5.8 J
Benzo(k)fluoranthene	11 U	5.6 J
bis(2-Chloroethoxy)methane	270 U	300 U
bis(2-Chloroethyl)ether	270 U	300 U
bis(2-Ethylhexyl)phthalate	55 U	60 U
Butylbenzylphthalate	270 U	300 U
Caprolactam	270 U	300 U
Carbazole	11 U	1.6 J
Chrysene	11 U	8.7 J
Dibenz(a,h)anthracene	11 U	8.8 J
Dibenzofuran	270 U	300 U
Diethylphthalate	270 U	300 U
Dimethyl phthalate	270 U	300 U
Di-n-butylphthalate	55 U	60 U
Di-n-octylphthalate	270 U	300 U
Fluoranthene	11 U	12 J
Fluorene	11 U	12 U
Hexachlorobenzene	11 U	12 U
Hexachlorobutadiene	270 U	300 U
Hexachlorocyclopentadiene	270 U	300 U
Hexachloroethane	11 U	12 U
Indeno(1,2,3-cd)pyrene	11 U	17 J
Isophorone	270 U	300 U
Naphthalene	11 U	12 U
n-Nitroso-di-n-propylamine	270 U	300 U
n-Nitrosodiphenylamine	270 U	300 U
Nitrobenzene	270 U	300 U
Pentachlorophenol	55 U	60 U
Phenanthrene	11 U	4.4 J
Phenol	270 U	300 U
Pyrene	11 U	12 J
Total Metals (MG/KG)		
Aluminum	39,400 J	39,200 J
Antimony	0.08 J	0.09 J
Arsenic	0.64	0.53
Barium	224 J	121 J
Beryllium	0.34	0.4
Cadmium	0.08	0.05 J
Calcium	5,370 J	6,020 J
Chromium	27 J	26 J
Cobalt	18.4	21.4
Copper	85.4 J	77.2 J
Cyanide	0.44 U	0.48 U
Iron	39,700	39,200
Lead	2	2
Magnesium	4,490 J	4,340 J
Manganese	2,360 J	1,100 J

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Station ID	VEPQ/R-SO02	
Sample ID	VEPQ_R-SB02-0709-0810	VEPQ_R-SB02P-0709-0810
Sample Date	08/10/10	08/10/10
Chemical Name		
Mercury	0.01 J	0.01 J
Nickel	16.6 J	13.2 J
Potassium	1,450 J	1,480 J
Selenium	0.24 U	0.28 U
Silver	0.032 U	0.02 J
Sodium	329 J	350 J
Thallium	0.05 J	0.04 J
Vanadium	128	116
Zinc	33.5	29
Wet Chemistry		
% Solids (pct)	86	82
pH (ph)	7.8	8.2
Total organic carbon (TOC) (ug/g)	12,000	9,500
Geotechnical (G/CC)		
Density	1.56	1.6
Grain Size (PCT)		
Clay (%)	14.3	32.9
Coarse Sand (%)	4.5	3.4
Fine Sand (%)	33.1	19.3
Gravel (%)	0	5.1
GRAINSIZE (PCT/P)		
GS03 Sieve 3" (75 mm)	100	100
GS05 Sieve 2" (50 mm)	100	100
GS06 Sieve 1.5" (37.5 mm)	100	100
GS07 Sieve 1" (25.0 mm)	100	100
GS08 Sieve 0.75" (19.0 mm)	100	100
GS10 Sieve 0.375" (9.5 mm)	100	100
GRAINSIZE (MM)		
Hyd1 - Particle Diam. (mm)	0.0336	0.032
GRAINSIZE (PCT/P)		
Hyd1 - Percent Passing (%)	22.4	43.4
GRAINSIZE (MM)		
Hyd2 - Particle Diam. (mm)	0.0214	0.0205
GRAINSIZE (PCT/P)		
Hyd2 - Percent Passing (%)	20.2	40.5
GRAINSIZE (MM)		
Hyd3 - Particle Diam. (mm)	0.0125	0.0119
GRAINSIZE (PCT/P)		
Hyd3 - Percent Passing (%)	17.9	37.5
GRAINSIZE (MM)		
Hyd4 - Particle Diam. (mm)	0.0091	0.0084
GRAINSIZE (PCT/P)		
Hyd4 - Percent Passing (%)	16.6	34.6
GRAINSIZE (MM)		
Hyd5 - Particle Diam. (mm)	0.0062	0.0061
GRAINSIZE (PCT/P)		
Hyd5 - Percent Passing (%)	14.3	32.9
GRAINSIZE (MM)		
Hyd6 - Particle Diam. (mm)	0.0032	0.0031
GRAINSIZE (PCT/P)		
Hyd6 - Percent Passing (%)	13.9	31.2
GRAINSIZE (MM)		
Hyd7 - Particle Diam. (mm)	0.0013	0.0013
GRAINSIZE (PCT/P)		
Hyd7 - Percent Passing (%)	11.7	28.3
GRAINSIZE (PCT)		
Medium Sand (%)	27.7	12.4
Sand (%)	65.3	35.1
GRAINSIZE (PCT/P)		
Sieve No. 004 (4.75 mm)	100	94.9
Sieve No. 010 (2.00 mm)	95.5	91.5
Sieve No. 020 (850 um)	84.6	86.9
Sieve No. 040 (425 um)	67.8	79.1
Sieve No. 060 (250 um)	53.7	72.2
Sieve No. 080 (180 um)	46.9	68.5
Sieve No. 100 (150 um)	44	66.8
Sieve No. 200 (75 um)	34.7	59.8

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Station ID	VEPQ/R-SO02	
Sample ID	VEPQ_R-SB02-0709-0810	VEPQ_R-SB02P-0709-0810
Sample Date	08/10/10	08/10/10
Chemical Name		
GRAINSIZE (PCT)		
Silt (%)	20.4	26.9

Notes:

Shading indicates detections
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - The material was analyzed for, but not detected
MG/KG - Milligrams per kilogram
PCT - Percent
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

Vieques East
PAOC R
Final Surface Soil Raw Analytical Results
August 2010

Station ID	VEPQ/R-SO02
Sample ID	VEPQ_R-SS02-0304-0810
Sample Date	08/10/10
Chemical Name	
Volatile Organic Compounds (UG/KG)	
1,1,1-Trichloroethane	2.8 U
1,1,2,2-Tetrachloroethane	2.8 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	2.8 U
1,1,2-Trichloroethane	2.8 U
1,1-Dichloroethane	2.8 U
1,1-Dichloroethene	2.8 U
1,2,3-Trichlorobenzene	2.8 U
1,2,4-Trichlorobenzene	2.8 U
1,2-Dibromo-3-chloropropane	2.8 U
1,2-Dibromoethane	2.8 U
1,2-Dichlorobenzene	2.8 U
1,2-Dichloroethane	2.8 U
1,2-Dichloropropane	2.8 U
1,3-Dichlorobenzene	2.8 U
1,4-Dichlorobenzene	2.8 U
2-Butanone	26 J
2-Hexanone	14 U
4-Methyl-2-pentanone	14 U
Acetone	140
Benzene	2.8 U
Bromochloromethane	2.8 U
Bromodichloromethane	2.8 U
Bromoform	2.8 U
Bromomethane	5.5 U
Carbon disulfide	2.8 U
Carbon tetrachloride	2.8 U
Chlorobenzene	2.8 U
Chloroethane	5.5 U
Chloroform	2.8 U
Chloromethane	5.5 U
cis-1,2-Dichloroethene	2.8 U
cis-1,3-Dichloropropene	2.8 U
Cyclohexane	2.8 U
Dibromochloromethane	2.8 U
Dichlorodifluoromethane (Freon-12)	5.5 U
Ethylbenzene	2.8 U
Isopropylbenzene	2.8 U
m- and p-Xylene	5.5 U
Methyl acetate	3.3 U
Methylcyclohexane	2.8 U
Methylene chloride	14 U
Methyl-tert-butyl ether (MTBE)	2.8 U
o-Xylene	2.8 U
Styrene	2.8 U
Tetrachloroethene	2.8 U
Toluene	2.8 U
trans-1,2-Dichloroethene	2.8 U
trans-1,3-Dichloropropene	2.8 U
Trichloroethene	2.8 U
Trichlorofluoromethane (Freon-11)	5.5 U
Vinyl chloride	5.5 U
Semivolatile Organic Compounds (UG/KG)	
1,1-Biphenyl	290 U
1,2,4,5-Tetrachlorobenzene	290 U
1,4-Dioxane	58 U
2,2'-Oxybis(1-chloropropane)	290 U
2,3,4,6-Tetrachlorophenol	290 U
2,4,5-Trichlorophenol	720 U
2,4,6-Trichlorophenol	290 U
2,4-Dichlorophenol	290 U

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Station ID	VEPQ/R-SO02
Sample ID	VEPQ_R-SS02-0304-0810
Sample Date	08/10/10
Chemical Name	
2,4-Dimethylphenol	290 U
2,4-Dinitrophenol	720 U
2,4-Dinitrotoluene	290 U
2,6-Dinitrotoluene	290 U
2-Chloronaphthalene	12 U
2-Chlorophenol	290 U
2-Methylnaphthalene	12 U
2-Methylphenol	290 U
2-Nitroaniline	720 U
2-Nitrophenol	290 U
3- and 4-Methylphenol	290 U
3,3'-Dichlorobenzidine	290 U
3-Nitroaniline	720 U
4,6-Dinitro-2-methylphenol	720 U
4-Bromophenyl-phenylether	290 U
4-Chloro-3-methylphenol	290 U
4-Chloroaniline	290 U
4-Chlorophenyl-phenylether	290 U
4-Nitroaniline	720 U
4-Nitrophenol	720 U
Acenaphthene	12 U
Acenaphthylene	12 U
Acetophenone	290 U
Anthracene	12 U
Atrazine	290 U
Benzaldehyde	290 R
Benzo(a)anthracene	4.3 J
Benzo(a)pyrene	4.8 J
Benzo(b)fluoranthene	8.4 J
Benzo(g,h,i)perylene	12 U
Benzo(k)fluoranthene	3.8 J
bis(2-Chloroethoxy)methane	290 U
bis(2-Chloroethyl)ether	290 U
bis(2-Ethylhexyl)phthalate	91 U
Butylbenzylphthalate	290 U
Caprolactam	290 U
Carbazole	12 U
Chrysene	6.2 J
Dibenz(a,h)anthracene	12 U
Dibenzofuran	290 U
Diethylphthalate	290 U
Dimethyl phthalate	290 U
Di-n-butylphthalate	58 U
Di-n-octylphthalate	290 U
Fluoranthene	5.2 J
Fluorene	12 U
Hexachlorobenzene	12 U
Hexachlorobutadiene	290 U
Hexachlorocyclopentadiene	290 U
Hexachloroethane	12 U
Indeno(1,2,3-cd)pyrene	13 J
Isophorone	290 U
Naphthalene	12 U
n-Nitroso-di-n-propylamine	290 U
n-Nitrosodiphenylamine	290 U
Nitrobenzene	290 U
Pentachlorophenol	58 U
Phenanthrene	12 U
Phenol	290 U
Pyrene	8.1 J
Total Metals (MG/KG)	
Aluminum	20,800 J

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Station ID	VEPQ/R-SO02
Sample ID	VEPQ_R-SS02-0304-0810
Sample Date	08/10/10
Chemical Name	
Antimony	0.23 J
Arsenic	1.1
Barium	69.5 J
Beryllium	0.24
Cadmium	0.12
Calcium	20,600 J
Chromium	13.8 J
Cobalt	11.7
Copper	56.8 J
Cyanide	0.48 U
Iron	27,500
Lead	5.4
Magnesium	5,910 J
Manganese	466 J
Mercury	0.02 J
Nickel	6.2 J
Potassium	1,630 J
Selenium	0.3 U
Silver	0.01 J
Sodium	258 J
Thallium	0.03 J
Vanadium	82
Zinc	57.8
Wet Chemistry	
% Solids (pct)	81
pH (ph)	8
Total organic carbon (TOC) (ug/g)	28,000
Geotechnical (G/CC)	
Density	1.28
Grain Size (PCT)	
Clay (%)	18.9
Coarse Sand (%)	7
Fine Sand (%)	21.4
Gravel (%)	13.6
GRAINSIZE (PCT/P)	
GS03 Sieve 3" (75 mm)	100
GS05 Sieve 2" (50 mm)	100
GS06 Sieve 1.5" (37.5 mm)	100
GS07 Sieve 1" (25.0 mm)	100
GS08 Sieve 0.75" (19.0 mm)	100
GS10 Sieve 0.375" (9.5 mm)	92.6
GRAINSIZE (MM)	
Hyd1 - Particle Diam. (mm)	0.0322
GRAINSIZE (PCT/P)	
Hyd1 - Percent Passing (%)	29.8
GRAINSIZE (MM)	
Hyd2 - Particle Diam. (mm)	0.0206
GRAINSIZE (PCT/P)	
Hyd2 - Percent Passing (%)	27.7
GRAINSIZE (MM)	
Hyd3 - Particle Diam. (mm)	0.0121
GRAINSIZE (PCT/P)	
Hyd3 - Percent Passing (%)	23.4
GRAINSIZE (MM)	
Hyd4 - Particle Diam. (mm)	0.0087
GRAINSIZE (PCT/P)	
Hyd4 - Percent Passing (%)	21.1
GRAINSIZE (MM)	
Hyd5 - Particle Diam. (mm)	0.0063
GRAINSIZE (PCT/P)	

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Station ID	VEPQ/R-SO02
Sample ID	VEPQ_R-SS02-0304-0810
Sample Date	08/10/10
Chemical Name	
Hyd5 - Percent Passing (%)	18.9
GRAINSIZE (MM)	
Hyd6 - Particle Diam. (mm)	0.0031
GRAINSIZE (PCT/P)	
Hyd6 - Percent Passing (%)	16.4
GRAINSIZE (MM)	
Hyd7 - Particle Diam. (mm)	0.0013
GRAINSIZE (PCT/P)	
Hyd7 - Percent Passing (%)	13.2
GRAINSIZE (PCT)	
Medium Sand (%)	16.7
Sand (%)	45.1
GRAINSIZE (PCT/P)	
Sieve No. 004 (4.75 mm)	86.4
Sieve No. 010 (2.00 mm)	79.4
Sieve No. 020 (850 um)	71.9
Sieve No. 040 (425 um)	62.7
Sieve No. 060 (250 um)	54.9
Sieve No. 080 (180 um)	50.6
Sieve No. 100 (150 um)	48.7
Sieve No. 200 (75 um)	41.3
GRAINSIZE (PCT)	
Silt (%)	22.4

Notes:

Shading indicates detections

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

R - Unreliable Result

U - The material was analyzed for, but not detected

MG/KG - Milligrams per kilogram

PCT - Percent

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

Vieques East
PI 7
Final Subsurface Soil Raw Analytical Data
August 2010

Station ID	VEP7-SO42	
Sample ID	PI07-SB42-0101H-0810	PI07-SB42P-0101H-0810
Sample Date	08/17/10	08/17/10
Chemical Name		
Semivolatile Organic Compounds (UG/KG)		
1,4-Dioxane	51 U	52 U
2-Chloronaphthalene	10 U	10 U
2-Methylnaphthalene	10 U	10 U
Acenaphthene	10 U	10 U
Acenaphthylene	10 U	10 U
Anthracene	10 U	10 U
Benzo(a)anthracene	10 U	10 U
Benzo(a)pyrene	10 U	10 U
Benzo(b)fluoranthene	10 U	10 U
Benzo(g,h,i)perylene	10 U	10 U
Benzo(k)fluoranthene	10 U	10 U
bis(2-Ethylhexyl)phthalate	75 U	53 U
Carbazole	10 U	10 U
Chrysene	10 U	10 U
Dibenz(a,h)anthracene	10 U	10 U
Di-n-butylphthalate	51 U	52 U
Fluoranthene	10 U	10 U
Fluorene	10 U	10 U
Hexachlorobenzene	10 U	10 U
Hexachloroethane	10 U	10 U
Indeno(1,2,3-cd)pyrene	10 U	10 U
Naphthalene	10 U	10 U
Pentachlorophenol	51 U	52 U
Phenanthrene	10 U	10 U
Pyrene	10 U	10 U
Wet Chemistry		
% Solids (pct)	95	94

Notes:

Shading indicates detections

U - The material was analyzed for, but not detected

PCT - Percent

UG/KG - Micrograms per kilogram

Vieques East
PI 7
Final Surface Soil Raw Analytical Data
August 2010

Station ID	VEP7-SO42
Sample ID	PI07-SS42-0001-0810
Sample Date	08/17/10
Chemical Name	
Semivolatile Organic Compounds (UG/KG)	
1,4-Dioxane	58 U
2-Chloronaphthalene	12 U
2-Methylnaphthalene	12 U
Acenaphthene	12 U
Acenaphthylene	12 U
Anthracene	12 U
Benzo(a)anthracene	12 U
Benzo(a)pyrene	12 U
Benzo(b)fluoranthene	12 U
Benzo(g,h,i)perylene	12 U
Benzo(k)fluoranthene	12 U
bis(2-Ethylhexyl)phthalate	58 U
Carbazole	12 U
Chrysene	12 U
Dibenz(a,h)anthracene	12 U
Di-n-butylphthalate	58 U
Fluoranthene	12 U
Fluorene	12 U
Hexachlorobenzene	12 U
Hexachloroethane	12 U
Indeno(1,2,3-cd)pyrene	12 U
Naphthalene	12 U
Pentachlorophenol	58 U
Phenanthrene	12 U
Pyrene	12 U
Wet Chemistry	
% Solids (pct)	81

Notes:

Shading indicates detections

U - The material was analyzed for, but not detected

PCT - Percent

UG/KG - Micrograms per kilogram

Appendix C
Data Quality Evaluation

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PAOC Q Data Quality Evaluation

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APPENDIX C

PAOC Q Data Quality Evaluation

C.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 was 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, an independent, third-party validator 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 an independent review by a third-party validator, and ends with an overall review by the Navy contractor project chemistry team. While only the data validator is allowed to apply qualifiers to the data, the process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

This document presents the results of the data quality evaluation performed on the data set corresponding to Vieques PAOC-Q surface and subsurface soil samples collected on August 11, 2010 (date range).

C.0.1 Laboratory Internal Quality Control Review

Prior to releasing the analytical data, the laboratory reviewed both the sample and QC data to verify sample identity, instrument calibration, quantitation limits, 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.

C.0.2 Data Validation

An independent data validator reviewed all data packages using the validation criteria outlined in the site-specific UFP-SAP work plan, the analytical methodology, and the laboratory's SOPs. USEPA Region II checklists and/or National Functional Guidelines were applied to the data to help the validator create a thorough and systematic approach to the validation process. As stated above, the data validation process was independent and 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). Additionally, the analytical spectrum and raw data output were reviewed and laboratory results selected by the validator were recalculated from the raw data to verify final laboratory identification and quantitation.

When multiple analyses were performed, the analytical run with the lowest quantitation limits was selected by the validator if the QC criteria were met for that analysis. If a sample was analyzed more than once as a result of concentrations exceeding the calibration range, the data validator selected results from the appropriate dilution. When multiple analyses were performed and QC criteria were outside of control limits for all analyses, the data validator selected results from the analytical run with the least number of exceptions or best possible QC.

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 third-party 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 quantitation limit 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, one should use "J-qualified concentrations the same way as positive data that do not have this qualifier" (Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual. (Part A) EPA/540/1-89/002. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1989). U-qualified and UJ-qualified results are available, at the reported quantitation limit 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 quantitation limit," 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 project action limits. 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.

C.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 quantitation limit. 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 problem.
- **UJ** – Not detected, quantitation limit estimated. Sample was analyzed for this parameter, but it was not detected above the reported quantitation limit. The quantitation limit 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 quantitation limit and thus does not necessarily indicate a quality control problem.
- **[No qualifier present] -** Detected. Qualification was not warranted.

C.0.4 Secondary Data Validation Qualifiers (Reason Codes)

The following secondary data validation qualifiers (DV_Qual_Code or "reason codes") were applied to one or more analytical results resulting in the following combinations:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC	Explanation
U	CLEAR	119	83.22%	X				Constituent was analyzed for but not detected. Further qualification was not necessary (no QA/QC exceedances). The result is usable as a nondetect at the reported quantitation limit.
CLEAR	CLEAR	8	5.59%	X				Constituent was analyzed for and detected. Further qualification was not necessary (no QA/QC exceedances). The result is usable as a detect as reported..
J	BRL	2	1.40%	X				Constituent was analyzed for and detected. The detection was less than the limit of quantitation (LOQ) and J- or B- qualified (as in "below reporting limit") by the laboratory. Further qualification was not necessary (no QA/QC exceedances) except to standardize the qualifier to a valid value. The result is usable as reported as a detect.
U	MBL	2	1.40%		X			Constituent was analyzed for and detected. Often, the detection was less than the quantitation limit and/or also detected in a blank. The result was U-qualified as "not detected at significantly greater than that in an associated blank". When the detection was less than the quantitation limit, the data validator raised it to the quantitation limit. The QA/QC exceedance was not severe enough to warrant rejection. The result is usable as a nondetect at the reported (final) quantitation limit. Thus, there is no impact on the availability of data for use by the project team. On reporting tables, these results cannot easily be distinguished from true nondetect results.
U	CCBL	1	0.70%		X			Constituent was analyzed for and detected. The result was U-qualified as "nondetect" due to constituent detection in the continuing calibration blank. The QA/QC exceedance (potential low bias) was not severe enough to warrant rejection. The result is usable as a nondetect at the reported LOD. Thus, there is no impact on the availability of data for use by the project team.
J	MSH	1	0.70%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to high recovery in a matrix spike and/or matrix spike duplicate. The QA/QC exceedance (potential high bias) was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
J	LD	3	2.10%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to a lack of laboratory duplicate reproducibility. The QA/QC exceedance was not severe enough to warrant rejection. The results is usable as reported.
J	SD	1	0.70%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to serial dilution reproducibility (serial dilution percent difference exceeding the upper control limit). The QA/QC exceedance (potential precision issue) was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
J	OT	5	3.50%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due a nonconformance in the ICSA standard. Detected values in the ICSA control standard were not within control limits. The QA QC nonconformance was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
UJ	CCL	1	0.70%		X			Constituent was analyzed for but not detected. The result was UJ-qualified as "nondetect, estimated quantitation limit" due to low recovery in a continuing calibration verification. The QA/QC exceedance (potential low bias) was not severe enough to warrant rejection. The result is usable as a nondetect at the reported quantitation limit. Thus, there is no impact on the availability of data for use by the project team.
	TOTAL:	143	100.00%	90.20%	9.80%			
				100.00% available for use, qualified as applicable (completeness goal of 95% available data met)				

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C.0.5 Impact of Data Quality on Project Data Quality Objectives and Data Usability Data Validation

This data quality evaluation assesses definitive data points. Screening level data such as pH, grain size, alkalinity, TOC, etc., for which there is no regulatory criteria, is not included in this data quality evaluation as the overall impact to data usability based on these results alone is inconsequential.

The laboratories analyzed the samples in accordance with EPA SW-846 methods. The data packages were reviewed by an independent data validator using USEPA Region II validation checklists.

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, UJ-qualifiers, and U-qualifiers, to represent "estimated," "non-detect, estimated quantitation limit," and "non-detect" or "not detected at significantly greater than that in an associated blank," respectively. The only time the data validator changed a result's detect status was when CLEAR or J-qualifiers were changed to U-qualifiers or UJ-qualifiers (detect to non-detect) as a result of blank contamination.

The J- and UJ-qualifiers indicate that some results are estimated. These qualifiers indicate that data are available for use as 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 quantitation limit 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 quantitation limit. 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 quantitation limits to be greater than project action limits or for quantitation limits to be elevated above what was expected or requested. In many cases, project action limits are simply unreasonably low or the laboratory was forced, by the analytical method or sample matrices, to raise quantitation limits for various reasons. In the instance where non-detect quantitation limits are greater than project action limits,

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 project action limits:

- If a criterion (project action limit) is unreasonably low, current instrumentation technology may not be able to achieve an RL lower than the project action limit.
- The quantitation limit may have been established at a time when the criterion (project action limit) was higher (less stringent), but the reporting is being done using new (more stringent) criteria. Published criteria sets, such as EPA Regional Screening Levels, may change 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 quantitation 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 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.

C.0.6 Comparison of Nondetects to Project Action Limits

When evaluating the data and making decisions, the project team compares detected sample results to project action limits (PALs) in order to determine exceedances. The PAL is the level at which a sample concentration dictates an action or causes an understanding. For this project, the PALs are as follows:

- Surface soil samples are compared to Adjusted Residential Soil EPA Regional Screening Levels (RSLs) (May, 2010) and Ecological Soil Toxicity Reference Values (TRVs).
- Subsurface soil samples are compared to Adjusted Residential Soil EPA RSLs (May, 2010).

Nondetect results are also compared to project action limits, typically during a risk assessment or exceedance screening, by comparing one-half the quantitation limit to the

project action limit. 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 QL) 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 project action limit. If the nondetect results (quantitation limits) are not low enough when compared to the PAL, then it may be possible that the constituent is present in a sample at greater than the PAL 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 N.0.5, above. Most notably, Worksheet 15 in the UFP-SAP Work plan predicts when this is expected and unavoidable and Worksheet 11 discusses the uncertainty surrounding this situation.

When a U-Value exceeds a PAL, it is worthwhile to consider the MDL. Note that MDLs, as reported by the laboratory are "Adjusted MDLs" in that they are adjusted for dilution factors, matrix interference, etc. This is synonymous with the adjustment of LODs (U-Values). The MDL, while statistically-calculated, is the level at which the laboratory is likely to detect and report a constituent, if present in the sample. Therefore, if the MDL is less than the PAL, then if the analyte is detected at or at greater than the PAL, then the laboratory would report it. The detection would be qualified because it is less than the LOD.

For instances where the MDL is greater than the PAL, the data user must understand that an analyte may be present in a sample at or at greater than the PAL, but the laboratory instrumentation may not be sensitive enough to detect it. This is most-often the case because the PAL is set without considering the current technology available to analyze at the concentration range of interest.

C.0.7 PARCC Considerations

C.0.7.1 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. No data points were deemed unusable (rejected) due to precision exceedances; as a result, there is no negative impact on precision.

C.0.7.2 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. No data points were deemed unusable (rejected) due to accuracy exceedances; as a result, there is no negative impact on accuracy.

C.0.7.3 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.

C.0.7.4 Completeness

For purposes of this DQE and as defined in the UFP-SAP work plan, completeness will be defined as the percentage of measurements that are judged to be valid; validity being defined by the DQOs. Therefore, completeness will be 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, Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B (Rev 3, Oct 2006); SOP NO. HW-24, Validating Semivolatile Compounds by SW-846 Method 8270 (Rev. 3, October 2006); SOP HW-22, Nitroaromatics and Nitroamines by HPLC (Rev. 2, September, 2006); SOP HW-16, Data Validation SOP of Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B (Rev 1, October, 2006); SOP HW-44, Data Validation SOP of PCBs by Gas Chromatography SW-846 Method 8082A (Rev 1, October, 2006); HW-45, and Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3 (SOP Revision 13); (Revision 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 for each combination of site, matrix, and analysis group. Per the Vieques Master QAPP (CH2M HILL, May, 2007), under which data from these sites were collected, this project has a 95 percent completeness goal. Overall, the entire data set was 100.00% complete.

C.0.7.5 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 (surface soil, subsurface soil, and groundwater), and EPA methods, EPA SW-846 methods, and ASTM 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. The data user may be confident that this data set is comparable to others of high data quality.

C.1 PAOC-Q

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the data for the SI/ESI Addendum PAOC-Q Report, as well as to provide an assessment of data usability. The impact of rejected data on data usability is discussed in the individual subsections below.

C.1.1 PAOC-Q Surface Soil Data

This evaluation assesses the analytical results of the surface soil samples collected on August 11, 2010.

C.1.1.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	48	94.12%	X			
VOA	J	CLEAR	2	3.92%	X			
VOA	U	MBL	1	1.96%		X		
TOTAL:			51	100.00%	98.04%	1.96%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.1.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	65	95.59%	X			
SVOA	J	CLEAR	2	2.94%	X			
SVOA	U	MB L	1	1.47%		X		
TOTAL:			68	100.00%	95.53%	1.47%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.1.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	7	29.17%	X			
METAL	J	OT	5	20.83%		X		
METAL	J	LD	3	12.50%		X		
METAL	J	CLEAR	3	12.50%		X		
METAL	U	CLEAR	2	8.33%	X			
METAL	J	MSL	1	4.17%		X		
METAL	J	MSH	1	4.17%		X		
METAL	U	MBL	1	4.17%		X		
METAL	J	SD	1	4.17%		X		
TOTAL:			24	100.00%	37.50%	62.50%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2 PAOC-Q Subsurface Soil Data

This evaluation assesses the analytical results of the subsurface soil samples collected on August 11, 2010.

C.1.2.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	48	94.12%	X			
VOA	CLEAR	CLEAR	1	1.96%	X			
VOA	UJ	CCL	1	1.96%		X		
VOA	U	MBL	1	1.96%		X		
TOTAL:			51	100.00%	96.08%	3.92%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	67	98.53%	X			
SVOA	U	MBL	1	1.47%		X		
TOTAL:			68	100.00%	98.53%	1.47%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	7	29.17%	X			
METAL	J	OT	5	20.83%		X		
METAL	U	CLEAR	4	16.67%	X			
METAL	J	LD	3	12.50%		X		
METAL	J	CLEAR	2	8.33%	X			
METAL	U	CCBL	1	4.17%		X		
METAL	J	MSH	1	4.17%		X		
METAL	J	SD	1	4.17%		X		
TOTAL:			24	100.00%	54.17%	45.83%		
					100.00% available for use, qualified as applicable (completeness goal met)			

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PAOC R Data Quality Evaluation

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APPENDIX C

Data Quality Evaluation

C.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 was 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, an independent, third-party validator 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 an independent review by a third-party validator, and ends with an overall review by the Navy contractor project chemistry team. While only the data validator is allowed to apply qualifiers to the data, the process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

This document presents the results of the data quality evaluation performed on the data set corresponding to Vieques PAOC-R surface and subsurface soil samples collected on August 10, 2010(date range).

C.0.1 Laboratory Internal Quality Control Review

Prior to releasing the analytical data, the laboratory reviewed both the sample and QC data to verify sample identity, instrument calibration, quantitation limits, 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.

C.0.2 Data Validation

An independent data validator reviewed all data packages using the validation criteria outlined in the site-specific UFP-SAP work plan, the analytical methodology, and the laboratory's SOPs. USEPA Region II checklists and/or National Functional Guidelines were applied to the data to help the validator create a thorough and systematic approach to the validation process. As stated above, the data validation process was independent and 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). Additionally, the analytical spectrum and raw data output were reviewed and laboratory results selected by the validator were recalculated from the raw data to verify final laboratory identification and quantitation.

When multiple analyses were performed, the analytical run with the lowest quantitation limits was selected by the validator if the QC criteria were met for that analysis. If a sample was analyzed more than once as a result of concentrations exceeding the calibration range, the data validator selected results from the appropriate dilution. When multiple analyses were performed and QC criteria were outside of control limits for all analyses, the data validator selected results from the analytical run with the least number of exceptions or best possible QC.

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 third-party 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 quantitation limit 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, one should use "J-qualified concentrations the same way as positive data that do not have this qualifier" (Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual. (Part A) EPA/540/1-89/002. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1989). U-qualified and UJ-qualified results are available, at the reported quantitation limit 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 quantitation limit," 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 project action limits. 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.

C.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 quantitation limit. 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 problem.
- **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 quantitation limit and thus does not necessarily indicate a quality control problem.

- **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.

C.0.4 Secondary Data Validation Qualifiers (Reason Codes)

The following secondary data validation qualifiers (DV_Qual_Code or "reason codes") were applied to one or more analytical results resulting in the following combinations:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC	Explanation
U	CLEAR	329	76.69%	X				Constituent was analyzed for but not detected. Further qualification was not necessary (no QA/QC exceedances). The result is usable as a nondetect at the reported quantitation limit.
CLEAR	CLEAR	25	5.83%	X				Constituent was analyzed for and detected. Further qualification was not necessary (no QA/QC exceedances). The result is usable as a detect as reported..
J	BRL	31	7.23%	X				Constituent was analyzed for and detected. The detection was less than the limit of quantitation (LOQ) and J- or B- qualified (as in "below reporting limit") by the laboratory. Further qualification was not necessary (no QA/QC exceedances) except to standardize the qualifier to a valid value. The result is usable as reported as a detect.
U	MBL	8	1.86%		X			Constituent was analyzed for and detected. Often, the detection was less than the quantitation limit and/or also detected in a blank. The result was U-qualified as "not detected at significantly greater than that in an associated blank". When the detection was less than the quantitation limit, the data validator raised it to the quantitation limit. The QA/QC exceedance was not severe enough to warrant rejection. The result is usable as a nondetect at the reported (final) quantitation limit. Thus, there is no impact on the availability of data for use by the project team. On reporting tables, these results cannot easily be distinguished from true nondetect results.
J	MSL	3	0.70%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to low recovery in a matrix spike and/or matrix spike duplicate. The QA/QC exceedance (potential low bias) was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
J	MSH	3	0.70%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to high recovery in a matrix spike and/or matrix spike duplicate. The QA/QC exceedance (potential high bias) was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
J	LD	9	2.10%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to a lack of laboratory duplicate reproducibility. The QA/QC exceedance was not severe enough to warrant rejection. The results is usable as reported.
J	SD	3	0.70%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due to serial dilution reproducibility (serial dilution percent difference exceeding the upper control limit). The QA/QC exceedance (potential precision issue) was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
J	OT	15	3.50%		X			Constituent was analyzed for and detected. The result was J-qualified as "estimated" due a nonconformance in the ICSA standard. Detected values in the ICSA control standard were not within control limits. The QA QC nonconformance was not severe enough to warrant rejection. The result is usable as a detect as qualified. Thus, there is no impact on the availability of data for use by the project team.
R	CCH	3	0.70%			X		Constituent was analyzed for and may or may not have been detected. The result was R-qualified as "rejected" due to a continuing calibration exceedance. The QA/QC exceedance (extreme high bias) was severe enough that the result should not be used as a detect or as a nondetect for any purpose. This has a negative impact on completeness and a negative impact on accuracy.
	TOTAL:	429	100.00%	89.75%	9.56%	0.70%		
				99.30% available for use, qualified as applicable (completeness goal of 95% available data met)				

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C.0.5 Impact of Data Quality on Project Data Quality Objectives and Data Usability Data Validation

This data quality evaluation assesses definitive data points. Screening level data such as pH, grain size, alkalinity, TOC, etc., for which there is no regulatory criteria, is not included in this data quality evaluation as the overall impact to data usability based on these results alone is inconsequential.

The laboratories analyzed the samples in accordance with EPA SW-846 methods. The data packages were reviewed by an independent data validator using USEPA Region II validation checklists.

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, UJ-qualifiers, and U-qualifiers, to represent "estimated," "non-detect, estimated quantitation limit," and "non-detect" or "not detected at significantly greater than that in an associated blank," respectively. The only time the data validator changed a result's detect status was when CLEAR or J-qualifiers were changed to U-qualifiers or UJ-qualifiers (detect to non-detect) as a result of blank contamination.

The J- and UJ-qualifiers indicate that some results are estimated. These qualifiers indicate that data are available for use as 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 quantitation limit 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 quantitation limit. 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 quantitation limits to be greater than project action limits or for quantitation limits to be elevated above what was expected or requested. In many cases, project action limits are simply unreasonably low or the laboratory was forced, by the analytical method or sample matrices, to raise quantitation limits for various reasons. In the instance where non-detect quantitation limits are greater than project action limits,

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 project action limits:

- If a criterion (project action limit) is unreasonably low, current instrumentation technology may not be able to achieve an RL lower than the project action limit.
- The quantitation limit may have been established at a time when the criterion (project action limit) was higher (less stringent), but the reporting is being done using new (more stringent) criteria. Published criteria sets, such as EPA Regional Screening Levels, may change 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 quantitation 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 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.

C.0.6 Comparison of Nondetects to Project Action Limits

When evaluating the data and making decisions, the project team compares detected sample results to project action limits (PALs) in order to determine exceedances. The PAL is the level at which a sample concentration dictates an action or causes an understanding. For this project, the PALs are as follows:

- Surface soil samples are compared to Adjusted Residential Soil EPA Regional Screening Levels (RSLs) (May, 2010) and Ecological Soil Toxicity Reference Values (TRVs).
- Subsurface soil samples are compared to Adjusted Residential Soil EPA RSLs (May, 2010).

Nondetect results are also compared to project action limits, typically during a risk assessment or exceedance screening, by comparing one-half the quantitation limit to the project action limit. 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 project action limit. If the nondetect results (LOD) are not low enough when compared to the PAL, then it may be possible that the constituent is present in a sample at greater than the PAL 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 C.0.5, above. Most notably, Worksheet 15 in the UFP-SAP Work plan predicts when this is expected and unavoidable and Worksheet 11 discusses the uncertainty surrounding this situation.

When a U-Value exceeds a PAL, it is worthwhile to consider the MDL. Note that MDLs, as reported by the laboratory are "Adjusted MDLs" in that they are adjusted for dilution factors, matrix interference, etc. This is synonymous with the adjustment of LODs (U-Values). The MDL, while statistically-calculated, is the level at which the laboratory is likely to detect and report a constituent, if present in the sample. Therefore, if the MDL is less than the PAL, then if the analyte is detected at or at greater than the PAL, then the laboratory would report it. The detection would be qualified because it is less than the LOD.

For instances where the MDL is greater than the PAL, the data user must understand that an analyte may be present in a sample at or at greater than the PAL, but the laboratory instrumentation may not be sensitive enough to detect it. This is most-often the case because the PAL is set without considering the current technology available to analyze at the concentration range of interest.

C.0.7 PARCC Considerations

C.0.7.1 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. No data points were deemed unusable (rejected) due to precision exceedances; as a result, there is no negative impact on precision.

C.0.7.2 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. Although results may have been qualified due to exceedances that may suggest an impact on accuracy, there is no actual significant negative impact on accuracy unless a data point is deemed unusable (rejected) due to accuracy exceedances.

C.0.7.3 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.

C.0.7.4 Completeness

For purposes of this DQE and as defined in the UFP-SAP work plan, completeness will be defined as the percentage of measurements that are judged to be valid; validity being defined by the DQOs. Therefore, completeness will be 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, *Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B* (Rev 3, Oct 2006); SOP NO. HW-24, *Validating Semivolatile Compounds by SW-846 Method 8270* (Rev. 3, October 2006); SOP HW-22, *Nitroaromatics and Nitroamines by HPLC* (Rev. 2, September, 2006); SOP HW-16, *Data Validation SOP of Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B (Rev 1, October, 2006); SOP HW-44, Data Validation SOP of PCBs by Gas Chromatography SW-846 Method 8082A (Rev 1, October, 2006); HW-45*, and *Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3* (SOP Revision 13); (Revision 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 for each combination of site, matrix, and analysis group. Per the Vieques Master QAPP (CH2M HILL, May, 2007), under which data from these sites were collected, this project has a 95 percent completeness goal. Overall, the entire data set was 99.30% complete.

C.0.7.5 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 (surface soil, subsurface soil, and groundwater), and EPA methods, EPA SW-846 methods, and ASTM 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.

C.1 PAOC-R

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the data for the SI/ESI Addendum PAOC-R Report, as well as to provide an assessment of data usability. The impact of rejected data on data usability is discussed in the individual subsections below.

C.1.1 PAOC-R Surface Soil Data

This evaluation assesses the analytical results of the surface soil samples collected on August 10, 2010.

C.1.1.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	48	94.12%	X			
VOA	J	BRL	1	1.96%	X			
VOA	CLEAR	CLEAR	1	1.96%		X		
VOA	U	MBL	1	1.96%				
TOTAL:			51	100.00%	98.04%	1.96%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.1.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	58	85.29%	X			
SVOA	J	BRL	8	11.76%	X			
SVOA	R	CCH	1	1.47%			X	C, A[a]
SVOA	U	MBL	1	1.47%		X		
TOTAL:			68	100.00%	97.05%	1.47%	1.47%	
					98.52% available for use, qualified as applicable (completeness goal met)			

[a]Negative impact on completeness. Potential negative impact on accuracy.

Benzaldehyde was rejected in sample VEPQ_R-SS02-0304-0810 due to high recovery in the continuing calibration standard for this constituent which indicates a lack of instrument stability for this compound. This data point is not available for decision-making purposes.

C.1.1.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	8	33.33%	X			
METAL	J	OT	5	20.83%		X		
METAL	J	LD	3	12.50%		X		
METAL	J	BRL	3	12.50%	X			
METAL	J	MSL	1	4.17%				
METAL	J	MSH	1	4.17%		X		
METAL	U	MBL	1	4.17%		X		
METAL	J	SD	1	4.17%		X		
METAL	U	CLEAR	1	4.17%	X			
TOTAL:			24	100.00%	50.00%	50.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2 PAOC-R Subsurface Soil Data

This evaluation assesses the analytical results of the subsurface soil samples collected on August 10, 2010.

C.1.2.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	98	96.08%	X			
VOA	U	MBL	2	1.96%		X		
VOA	J	BRL	1	0.98%	X			
VOA	CLEAR	CLEAR	1	0.98%	X			
TOTAL:			102	100.00%	98.04%	1.96%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	NULL	121	88.97%	X			
SVOA	J	NULL	12	8.82%		X		
SVOA	R	CCH	2	1.47%			X	C, A[a]
SVOA	U	MBL	1	0.74%		X		
TOTAL:			136	100.00%	88.97%	9.56%	1.47%	
					98.53% available for use, qualified as applicable (completeness goal met)			

[a]Negative impact on completeness. Potential negative impact on accuracy.

Benzaldehyde was rejected in samples VEPQ_R-SB02-0709-0810 and VEPQ_R-SB02P-0709-0810 due to high recovery in the continuing calibration standard for this constituent which indicates a lack of instrument stability for this compound. This data point is not available for decision-making purposes.

C.1.2.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	15	31.25%	X			
METAL	J	OT	10	20.83%		X		
METAL	J	LD	6	12.50%		X		
METAL	J	BRL	6	12.50%	X			
METAL	U	CLEAR	3	6.25%	X			
METAL	J	MSL	2	4.17%		X		
METAL	J	MSH	2	4.17%		X		
METAL	U	MBL	2	4.17%		X		
METAL	J	SD	2	4.17%		x		
TOTAL:			48	100.00%	50.00%	50.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1 PAOC-R

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the data for the SI/ESI Addendum PAOC-R Report, as well as to provide an assessment of data usability. The impact of rejected data on data usability is discussed in the individual subsections below.

C.1.1 PAOC-R Surface Soil Data

This evaluation assesses the analytical results of the surface soil samples collected on August 10, 2010.

C.1.1.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	48	94.12%	X			
VOA	J	BRL	1	1.96%	X			
VOA	CLEAR	CLEAR	1	1.96%		X		
VOA	U	MBL	1	1.96%				
TOTAL:			51	100.00%	98.04%	1.96%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.1.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	58	85.29%	X			
SVOA	J	BRL	8	11.76%	X			
SVOA	R	CCH	1	1.47%			X	C, A[a]
SVOA	U	MBL	1	1.47%		X		
TOTAL:			68	100.00%	97.05%	1.47%	1.47%	
					98.52% available for use, qualified as applicable (completeness goal met)			

[a]Negative impact on completeness. Potential negative impact on accuracy.

Benzaldehyde was rejected in sample VEPQ_R-SS02-0304-0810 due to high recovery in the continuing calibration standard for this constituent which indicates a lack of instrument stability for this compound. This data point is not available for decision-making purposes.

C.1.1.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	8	33.33%	X			
METAL	J	OT	5	20.83%		X		
METAL	J	LD	3	12.50%		X		
METAL	J	BRL	3	12.50%	X			
METAL	J	MSL	1	4.17%				
METAL	J	MSH	1	4.17%		X		
METAL	U	MBL	1	4.17%		X		
METAL	J	SD	1	4.17%		X		
METAL	U	CLEAR	1	4.17%	X			
TOTAL:			24	100.00%	50.00%	50.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2 PAOC-R Subsurface Soil Data

This evaluation assesses the analytical results of the subsurface soil samples collected on August 10, 2010.

C.1.2.1 Volatile Compounds

Volatiles were analyzed by SW-846 method 8260B. The validation process resulted in the following qualifiers for results in the volatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
VOA	U	CLEAR	98	96.08%	X			
VOA	U	MBL	2	1.96%		X		
VOA	J	BRL	1	0.98%	X			
VOA	CLEAR	CLEAR	1	0.98%	X			
TOTAL:			102	100.00%	98.04%	1.96%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2.2 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C and 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	NULL	121	88.97%	X			
SVOA	J	NULL	12	8.82%		X		
SVOA	R	CCH	2	1.47%			X	C, A[a]
SVOA	U	MBL	1	0.74%		X		
TOTAL:			136	100.00%	88.97%	9.56%	1.47%	
					98.53% available for use, qualified as applicable (completeness goal met)			

[a]Negative impact on completeness. Potential negative impact on accuracy.

Benzaldehyde was rejected in samples VEPQ_R-SB02-0709-0810 and VEPQ_R-SB02P-0709-0810 due to high recovery in the continuing calibration standard for this constituent which indicates a lack of instrument stability for this compound. This data point is not available for decision-making purposes.

C.1.2.3 Metals

Metals (including mercury and cyanide) were analyzed by SW-846 methods 6020, 7471A, and 9012. The validation process resulted in the following qualifiers for results in the metals fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
METAL	CLEAR	CLEAR	15	31.25%	X			
METAL	J	OT	10	20.83%		X		
METAL	J	LD	6	12.50%		X		
METAL	J	BRL	6	12.50%	X			
METAL	U	CLEAR	3	6.25%	X			
METAL	J	MSL	2	4.17%		X		
METAL	J	MSH	2	4.17%		X		
METAL	U	MBL	2	4.17%		X		
METAL	J	SD	2	4.17%		x		
TOTAL:			48	100.00%	50.00%	50.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

PI-7 Data Quality Evaluation

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APPENDIX C

PI-7 Data Quality Evaluation

C.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 was 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, an independent, third-party validator 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 an independent review by a third-party validator, and ends with an overall review by the Navy contractor project chemistry team. While only the data validator is allowed to apply qualifiers to the data, the process provides a medium for essential communication between the laboratory, validator, and project team, and allows for data quality to be thoroughly evaluated.

This document presents the results of the data quality evaluation performed on the data set corresponding to Vieques PI 7 surface and subsurface soil samples collected on August 17 2010 (date range).

C.0.1 Laboratory Internal Quality Control Review

Prior to releasing the analytical data, the laboratory reviewed both the sample and QC data to verify sample identity, instrument calibration, quantitation limits, 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.

C.0.2 Data Validation

An independent data validator reviewed all data packages using the validation criteria outlined in the site-specific UFP-SAP work plan, the analytical methodology, and the laboratory's SOPs. USEPA Region II checklists and/or National Functional Guidelines were applied to the data to help the validator create a thorough and systematic approach to the validation process. As stated above, the data validation process was independent and 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). Additionally, the analytical spectrum and raw data output were reviewed and laboratory results selected by the validator were recalculated from the raw data to verify final laboratory identification and quantitation.

When multiple analyses were performed, the analytical run with the lowest quantitation limits was selected by the validator if the QC criteria were met for that analysis. If a sample was analyzed more than once as a result of concentrations exceeding the calibration range, the data validator selected results from the appropriate dilution. When multiple analyses were performed and QC criteria were outside of control limits for all analyses, the data validator selected results from the analytical run with the least number of exceptions or best possible QC.

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 third-party 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 quantitation limit 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, one should use "J-qualified concentrations the same way as positive data that do not have this qualifier" (Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual. (Part A) EPA/540/1-89/002. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. 1989). U-qualified and UJ-qualified results are available, at the reported quantitation limit 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 quantitation limit," 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 project action limits. 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.

C.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 quantitation limit. 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 problem.

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C.0.4 Secondary Data Validation Qualifiers (Reason Codes)

The following secondary data validation qualifiers (DV_Qual_Code or "reason codes") were applied to one or more analytical results resulting in the following combinations:

DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC	Explanation
U	CLEAR	72	96.00%	X				Constituent was analyzed for but not detected. Further qualification was not necessary (no QA/QC exceedances). The result is usable as a nondetect at the reported quantitation limit.
U	EBL	3	4.00%		X			Constituent was analyzed for and detected. Often, the detection was less than the quantitation limit and/or also detected in a blank. The result was U-qualified as "not detected at significantly greater than that in an associated blank". When the detection was less than the limit of detection, the data validator raised it to the limit of detection. The QA/QC exceedance was not severe enough to warrant rejection. The result is usable as a nondetect at the reported (final) limit of detection. Thus, there is no impact on the availability of data for use by the project team. On reporting tables, these results cannot easily be distinguished from true nondetect results.
	TOTAL:	75	100.00%	96.00%	4.00%			
				100.00% available for use, qualified as applicable (completeness goal of 95% available data met)				

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C.0.5 Impact of Data Quality on Project Data Quality Objectives and Data Usability Data Validation

This data quality evaluation assesses definitive data points. Screening level data such as pH, grain size, alkalinity, TOC, etc., for which there is no regulatory criteria, is not included in this data quality evaluation as the overall impact to data usability based on these results alone is inconsequential.

The laboratories analyzed the samples in accordance with, EPA SW-846 methods. The data packages were reviewed by an independent data validator using USEPA Region II validation checklists.

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 U-qualifiers to represent "non-detect" or "not detected at significantly greater than that in an associated blank,". The only time the data validator changed a result's detect status was when J-qualifiers were changed to U-qualifiers (detect to non-detect) as a result of blank contamination.

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 quantitation limit 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 quantitation limit. 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 quantitation limits to be greater than project action limits or for quantitation limits to be elevated above what was expected or requested. In many cases, project action limits are simply unreasonably low or the laboratory was forced, by the analytical method or sample matrices, to raise quantitation limits for various reasons. In the instance where non-detect quantitation limits are greater than project action limits, 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 project action limits:

- If a criterion (project action limit) is unreasonably low, current instrumentation technology may not be able to achieve an RL lower than the project action limit.
- The quantitation limit may have been established at a time when the criterion (project action limit) was higher (less stringent), but the reporting is being done using new (more

stringent) criteria. Published criteria sets, such as EPA Regional Screening Levels, may change 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 quantitation 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 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.

C.0.6 Comparison of Nondetects to Project Action Limits

When evaluating the data and making decisions, the project team compares detected sample results to project action limits (PALs) in order to determine exceedances. The PAL is the level at which a sample concentration dictates an action or causes an understanding. For this project, the PALs are as follows:

- Surface soil samples are compared to Adjusted Residential Soil EPA Regional Screening Levels (RSLs) (May, 2010) and Ecological Soil Toxicity Reference Values (TRVs).
- Subsurface soil samples are compared to Adjusted Residential Soil EPA RSLs (May, 2010).

Nondetect results are also compared to project action limits, typically during a risk assessment or exceedance screening, by comparing one-half the LOD to the project action limit. 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 project action limit. If the nondetect

results (LOD) are not low enough when compared to the PAL, then it may be possible that the constituent is present in a sample at greater than the PAL 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 C.0.5, above. Most notably, Worksheet 15 in the UFP-SAP Work plan predicts when this is expected and unavoidable and Worksheet 11 discusses the uncertainty surrounding this situation.

When a U-Value exceeds a PAL, it is worthwhile to consider the MDL. Note that MDLs, as reported by the laboratory are "Adjusted MDLs" in that they are adjusted for dilution factors, matrix interference, etc. This is synonymous with the adjustment of LODs (U-Values). The MDL, while statistically-calculated, is the level at which the laboratory is likely to detect and report a constituent, if present in the sample. Therefore, if the MDL is less than the PAL, then if the analyte is detected at or at greater than the PAL, then the laboratory would report it. The detection would be qualified because it is less than the LOD.

For these instances where the MDL is greater than the PAL, the data user must understand that an analyte may be present in a sample at or at greater than the PAL, but the laboratory instrumentation may not be sensitive enough to detect it. This is most-often the case because the PAL is set without considering the current technology available to analyze at the concentration range of interest.

C.0.7 PARCC Considerations

C.0.7.1 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. No data points were deemed unusable (rejected) due to precision exceedances; as a result, there is no negative impact on precision.

C.0.7.2 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. No data points were deemed unusable (rejected) due to accuracy exceedances; as a result, there is no negative impact on accuracy.

C.0.7.3 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.

C.0.7.4 Completeness

For purposes of this DQE and as defined in the UFP-SAP work plan, completeness will be defined as the percentage of measurements that are judged to be valid; validity being defined by the DQOs. Therefore, completeness will be 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, Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B (Rev 3, Oct 2006); SOP NO. HW-24, Validating Semivolatile Compounds by SW-846 Method 8270 (Rev. 3, October 2006); SOP HW-22, Nitroaromatics and Nitroamines by HPLC (Rev. 2, September, 2006); SOP HW-16, Data Validation SOP of Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B (Rev 1, October, 2006); SOP HW-44, Data Validation SOP of PCBs by Gas Chromatography SW-846 Method 8082A (Rev 1, October, 2006); HW-45, and Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3 (SOP Revision 13); (Revision 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 for each combination of site, matrix, and analysis group. Per the Vieques Master QAPP (CH2M HILL, May, 2007), under which data from these sites were collected, this project has a 95 percent completeness goal. Overall, the entire data set was 100.00% complete.

C.0.7.5 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 (surface soil, and subsurface soil), 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. The data user may be confident that this data set is comparable to others of high data quality.

C.1 PI 7 Report

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the data for the SI/ESI Addendum PI 7 Report, as well as to provide an assessment of data usability. The impact of rejected data on data usability is discussed in the individual subsections below.

C.1.1 PI 7 Surface Soil Data

This evaluation assesses the analytical results of the surface soil samples collected on August 17, 2010.

C.1.1.1 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	24	96.00%	X			
SVOA	U	EBL	1	4.00%		X		
TOTAL:			25	100.00%	96.00%	4.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2 PI 7 Subsurface Soil Data

This evaluation assesses the analytical results of the subsurface soil samples collected on August 17, 2010.

C.1.2.1 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	48	96.00%	X			
SVOA	U	EBL	2	4.00%		X		
TOTAL:			50	100.00%	96.00%	4.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1 PI 7 Report

The purpose of this data quality evaluation is to summarize the findings of the data validation and any effects on the availability of the data for the SI/ESI Addendum PI 7 Report, as well as to provide an assessment of data usability. The impact of rejected data on data usability is discussed in the individual subsections below.

C.1.1 PI 7 Surface Soil Data

This evaluation assesses the analytical results of the surface soil samples collected on August 17, 2010.

C.1.1.1 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	24	96.00%	X			
SVOA	U	EBL	1	4.00%		X		
TOTAL:			25	100.00%	96.00%	4.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

C.1.2 PI 7 Subsurface Soil Data

This evaluation assesses the analytical results of the subsurface soil samples collected on August 17, 2010.

C.1.2.1 Semivolatile Compounds

Semivolatiles were analyzed by SW-846 methods 8270C_SIM. The validation process resulted in the following qualifiers for results in the semivolatiles fraction:

Analysis Group	DV Qual	DV Qual Code	Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
SVOA	U	CLEAR	48	96.00%	X			
SVOA	U	EBL	2	4.00%		X		
TOTAL:			50	100.00%	96.00%	4.00%		
					100.00% available for use, qualified as applicable (completeness goal met)			

Appendix D
Data Validation Reports

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Project: CTO-111 Vieques, Vieques Island, Puerto Rico
Laboratory: Katahdin Analytical Services
Sample Delivery Group: SD4910
Fraction: Organic
Matrix: Soil
Report Date: 11/3/2010

This analytical quality assurance report is based upon a review of analytical data generated for soil samples. Two trip blanks, two equipment blanks, and one field duplicate sample were submitted with the samples for this Sample Delivery Group. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

The samples were analyzed for volatile organic compounds and semivolatile organic compounds. The sample analyses were performed in accordance with the procedures outlined in the methods referenced at the end of this report.

All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to Region II guidance:

- "USEPA Hazardous Waste Support Branch, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry", SW-846 Method 8260B, SOP HW-24, Revision 2, August 2008
- "USEPA Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry", SW-846 Method 8270D, SOP HW-22, Revision 4, August 2008

The following parameters were evaluated.

X	•	Data Completeness
X	•	Chain of Custody Documentation
X	•	Holding Times
X	•	Instrument Performance
X	•	Initial and Continuing Calibrations
X	•	Laboratory and Field Blank Analysis Results
X	•	Surrogate Compound Recoveries
X	•	Matrix Spike/Matrix Spike Duplicate Recoveries and Reproducibility
X	•	Field Duplicate Analysis Results
X	•	Laboratory Control Sample Results
X	•	Internal Standard Performance
X	•	Qualitative Identification
X	•	Quantitation/Reporting Limits

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:

Shawne M. Rodgers
President

11/3/2010

Date

1.0 *DATA COMPLETENESS*

The client ID for sample SD4910-5 was logged in incorrectly and needed to be revised to reflect the correct client sample ID, VEPQIR-SB02P-0709-0810. The laboratory was contacted and provided the revised analysis result forms and electronic data deliverable.

2.0 *CHAIN OF CUSTODY DOCUMENTATION*

The chain of custody documentation was complete.

3.0 *HOLDING TIMES*

All criteria were met. No qualifiers were applied.

4.0 *INSTRUMENT PERFORMANCE*

All criteria were met. No qualifiers were applied.

5.0 *INITIAL AND CONTINUING CALIBRATIONS*

The quantitation limits reported for benzaldehyde for samples VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, and VEPQIR-SB02P-0709-0810 have been rejected and should be considered suspect. The continuing calibration precision criterion was exceeded for this compound (> 90% Difference). This indicates a lack of instrument stability for this compound. The nondetected result have been marked "R" to indicate that they are suspect.

The quantitation limit reported for bromomethane for sample VEPQIR-SB01-0810-0810 should be considered a quantitative estimate. The continuing calibration precision criterion was exceeded for this compound. This indicates a lack of instrument stability for this compound. The nondetected result has been marked "UJ" to indicate that it is a quantitative estimate.

6.0 *LABORATORY AND FIELD BLANK ANALYSIS RESULTS*

The volatile compounds presented in the following table were detected in associated laboratory method blanks and field blanks. All concentrations for blank contaminants were less than their respective quantitation limits.

Blank	Compound	Concentration (µg/Kg)	Associated Samples
WG81025	Carbon disulfide	1.5	All, except VEPQIR-SB01-0810-0810
WG81122	Carbon disulfide	1.3	VEPQIR-SB01-0810-0810
VEPQIR-TB01-081010	Chloromethane	0.43	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-081010
VEPQIR-EB01-081010	Chloromethane	0.42	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-09810, VEPQIR-SB02P-0709-081010
VEPQIR-EB01-081110	Chloromethane	0.56	VEPQIR-SS01-0405-0810, VEPQIR-SB01-0810-0810

The positive results reported for carbon disulfide for all samples are qualitatively invalid due to the presence of this compound in associated laboratory method blanks. These sample results are all less than their respective quantitation limits. USEPA Region II protocol requires positive sample results for contaminants that are less than the quantitation limit, to be considered qualitatively invalid. Replacing results that are less than the quantitation limit with the Limit of Detection (LOD) and marked "U" has indicated this.

The semivolatile compounds presented in the following table were detected in associated laboratory method blanks and field blanks. All concentrations for blank contaminants were greater than their respective quantitation limits.

Blank	Compound	Concentration (µg/Kg)	Associated Samples
WG81151	Bis(2-Ethylhexyl)phthalate	66	All samples
VEPQIR-EB01-081010	Bis(2-Ethylhexyl)phthalate	167	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810
VEPQIR-EB01-081110	Bis(2-Ethylhexyl)phthalate	123	VEPQIR-SS01-0405-0810, VEPQIR-SB01-0810-0810

The positive results reported for bis(2-ethylhexyl)phthalate for all samples are qualitatively invalid due to the presence of this compound in associated laboratory method blanks. These sample results are all less than their respective quantitation limits. USEPA Region II protocol requires positive sample results for contaminants that are less than the quantitation limit, to be considered qualitatively invalid. Replacing results that are less than the quantitation limit with the Limit of Detection (LOD) and marked "U" has indicated this. Results that are greater than the LOD but less than the quantitation limit have been marked "U".

7.0 SURROGATE COMPOUND RECOVERIES

All criteria were met. No qualifiers were applied.

8.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY

All criteria were met. No qualifiers were applied.

9.0 FIELD DUPLICATE RESULTS

Duplicate samples, VEPQIR-SB02-0709-0810 and VEPQIR-SB02P-0709-0810, were submitted to the laboratory evaluate sampling and analytical precision for those analytes determined to be present. Results for the field duplicate samples are presented in Table 2. Precision is evaluated by

calculating the relative percent difference (%RPD) between duplicate pair results. There are no USEPA-established acceptance criteria for field duplicate samples. EDQ uses internal acceptance criteria of thirty percent for volatile detected compounds (and forty percent for extractable compounds) to evaluate solid field duplicate samples.

10.0 LABORATORY CONTROL SAMPLE RESULTS

All criteria were met. No qualifiers were applied.

11.0 INTERNAL STANDARD PERFORMANCE

All criteria were met. No qualifiers were applied.

12.0 QUALITATIVE IDENTIFICATION

All criteria were met. No qualifiers were applied.

13.0 QUANTITATION/REPORTING LIMITS

As required by USEPA protocol, all compounds, which were qualitatively identified at concentrations below their respective Limits of Quantitation (LOQs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

METHODOLOGY REFERENCES

Analysis	Reference
Volatile Organic Compounds	Method 8260B, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997.
Semivolatile Organic Compounds	Method 8270C, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997

Table 1 Samples For Data Validation Review
Vieques NTR, CTO-111
Vieques Island, Puerto Rico
Katahdin Analytical Services Sample Delivery Group SD4910

SAMPLE I.D.	LABORATORY I.D	DATE COLLECTED	MATRIX	ANALYSES PERFORMED		
				VOC	SVOC	METAL
VEPQIR-TB01-081010	SD4910-01	8/10/2010	Trip Blank	X		
VEPQIR-EB01-081010	SD4910-02	8/10/2010	Equipment Blank	X	X	X
VEPQIR-SS02-0304-0810	SD4910-03	8/10/2010	Soil	X	X	X
VEPQIR-SB02-0709-0810	SD4910-04	8/10/2010	Soil	X	X	X
VEPQIR-SB02P-0709-0810	SD4910-05	8/10/2010	Soil	X	X	X
VEPQIR-TB01-081110	SD4910-06	8/11/2010	Trip Blank	X		
VEPQIR-EB01-081110	SD4910-07	8/11/2010	Equipment Blank	X	X	X
VEPQIR-SS01-0405-0810	SD4910-08	8/11/2010	Soil	X	X	X
VEPQIR-SB01-0810-0810	SD4910-09	8/11/2010	Soil	X	X	X

VOC VOLATILE ORGANIC COMPOUNDS
SVOC SEMIVOLATILE ORGANIC COMPOUNDS (INCLUDING SIM ANALYSES)
METAL METALS, MERCURY, AND CYANIDE

Table 2 Field Duplicate Sample Results for Organic Results
Soil Duplicate Samples VEPQIR-SB02-0709-0810 and VEPQIR-SB02P-0709-0810

Compound	Sample Results (µg/Kg)		Field Duplicate Results (µg/Kg)		RPD	FOOT NOTES
	VEPQIR-SB02P-0709-0810		VEPQIR-SB02P-0709-0810			
Acetone	19	J	42		75	
Phenanthrene	ND		4.4	J	NC	
Fluoranthene	ND		12	J	NC	
Pyrene	ND		12	J	NC	
Benzo(a)anthracene	ND		5.8	J	NC	
Chrysene	ND		8.7	J	NC	
Benzo(b)fluoranthene	ND		12	J	NC	
Benzo(k)fluoranthene	ND		5.6	J	NC	
Benzo(a)pyrene	ND		7.8	J	NC	
Indeno(1,2,3-cd)pyrene	ND		17	J	NC	
Dibenzo(a,h)anthracene	ND		8.8	J	NC	
Benzo(g,h,i)perylene	ND		5.8	J	NC	

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-3
Client ID: PQIR-SS02-0304-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 81.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.0	5.5
Chloromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.5	5.5
Vinyl Chloride	U	5.5	ug/Kgdrywt	1	10	11.	0.96	5.5
Bromomethane	U	5.5	ug/Kgdrywt	1	10	11.	1.2	5.5
Chloroethane	U	5.5	ug/Kgdrywt	1	10	11.	1.4	5.5
Trichlorofluoromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.0	5.5
1,1-Dichloroethene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
Carbon Disulfide	~~J~~ U	~~2.0~~ 2.8	ug/Kgdrywt	1	6	6.6	0.86	2.8 MBL
Freon-113	U	2.8	ug/Kgdrywt	1	6	6.6	0.99	2.8
Methylene Chloride	U	14.	ug/Kgdrywt	1	25	28.	8.7	14.
Acetone		140	ug/Kgdrywt	1	33	36.	5.6	14.
trans-1,2-Dichloroethene	U	2.8	ug/Kgdrywt	1	7	7.7	0.78	2.8
Methyl tert-butyl Ether	U	2.8	ug/Kgdrywt	1	9	9.9	1.2	2.8
1,1-Dichloroethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.9	2.8
cis-1,2-Dichloroethene	U	2.8	ug/Kgdrywt	1	7	7.7	1.0	2.8
Bromochloromethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.0	2.8
Chloroform	U	2.8	ug/Kgdrywt	1	6	6.6	0.38	2.8
Carbon Tetrachloride	U	2.8	ug/Kgdrywt	1	5	5.5	1.4	2.8
1,1,1-Trichloroethane	U	2.8	ug/Kgdrywt	1	6	6.6	0.46	2.8
2-Butanone	J	26.	ug/Kgdrywt	1	29	32.	6.5	14.
Benzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
Cyclohexane	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
1,2-Dichloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
Trichloroethene	U	2.8	ug/Kgdrywt	1	6	6.6	0.65	2.8
1,2-Dichloropropane	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
Bromodichloromethane	U	2.8	ug/Kgdrywt	1	5	5.5	0.66	2.8
cis-1,3-Dichloropropene	U	2.8	ug/Kgdrywt	1	5	5.5	0.79	2.8
Toluene	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
4-Methyl-2-Pentanone	U	14.	ug/Kgdrywt	1	29	32.	6.5	14.
Tetrachloroethene	U	2.8	ug/Kgdrywt	1	6	6.6	1.3	2.8
trans-1,3-Dichloropropene	U	2.8	ug/Kgdrywt	1	7	7.7	0.95	2.8
1,1,2-Trichloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
Dibromochloromethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
1,2-Dibromoethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.3	2.8
2-Hexanone	U	14.	ug/Kgdrywt	1	25	28.	5.3	14.

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-3
Client ID: PQIR-SS02-0304-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 81.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.56	2.8
Ethylbenzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.6	2.8
m+p-Xylenes	U	5.5	ug/Kgdrywt	1	11	12.	1.9	5.5
o-Xylene	U	2.8	ug/Kgdrywt	1	5	5.5	1.4	2.8
Styrene	U	2.8	ug/Kgdrywt	1	5	5.5	0.56	2.8
Bromoform	U	2.8	ug/Kgdrywt	1	5	5.5	0.77	2.8
Isopropylbenzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
1,1,2,2-Tetrachloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	0.92	2.8
1,3-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.68	2.8
1,4-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.48	2.8
1,2-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.86	2.8
1,2-Dibromo-3-Chloropropane	U	2.8	ug/Kgdrywt	1	7	7.7	0.96	2.8
1,2,4-Trichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.87	2.8
1,2,3-Trichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.84	2.8
Methyl Acetate	U	3.3	ug/Kgdrywt	1	14	15.	3.0	3.3
Methylcyclohexane	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
p-Bromofluorobenzene		84.5	%					
Toluene-D8		108.	%					
1,2-Dichloroethane-D4		114.	%					
Dibromofluoromethane		113.	%					

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-4 ~~55~~ OK
Client ID: PQIR-~~SB~~02-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 86.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.0	5.5
Chloromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.5	5.5
Vinyl Chloride	U	5.5	ug/Kgdrywt	1	10	11.	0.96	5.5
Bromomethane	U	5.5	ug/Kgdrywt	1	10	11.	1.2	5.5
Chloroethane	U	5.5	ug/Kgdrywt	1	10	11.	1.4	5.5
Trichlorofluoromethane	U	5.5	ug/Kgdrywt	1	10	11.	1.0	5.5
1,1-Dichloroethene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
Carbon Disulfide	~~J~~ U	~~2.4~~ 2.8	ug/Kgdrywt	1	6	6.6	0.86	2.8 MBL
Freon-113	U	2.8	ug/Kgdrywt	1	6	6.6	0.99	2.8
Methylene Chloride	U	14.	ug/Kgdrywt	1	25	28.	8.7	14.
Acetone	J	19.	ug/Kgdrywt	1	33	36.	5.6	14.
trans-1,2-Dichloroethene	U	2.8	ug/Kgdrywt	1	7	7.7	0.78	2.8
Methyl tert-butyl Ether	U	2.8	ug/Kgdrywt	1	9	9.9	1.2	2.8
1,1-Dichloroethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.9	2.8
cis-1,2-Dichloroethene	U	2.8	ug/Kgdrywt	1	7	7.7	1.0	2.8
Bromochloromethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.0	2.8
Chloroform	U	2.8	ug/Kgdrywt	1	6	6.6	0.38	2.8
Carbon Tetrachloride	U	2.8	ug/Kgdrywt	1	5	5.5	1.4	2.8
1,1,1-Trichloroethane	U	2.8	ug/Kgdrywt	1	6	6.6	0.46	2.8
2-Butanone	U	14.	ug/Kgdrywt	1	29	32.	6.5	14.
Benzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
Cyclohexane	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
1,2-Dichloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
Trichloroethene	U	2.8	ug/Kgdrywt	1	6	6.6	0.65	2.8
1,2-Dichloropropane	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
Bromodichloromethane	U	2.8	ug/Kgdrywt	1	5	5.5	0.66	2.8
cis-1,3-Dichloropropene	U	2.8	ug/Kgdrywt	1	5	5.5	0.79	2.8
Toluene	U	2.8	ug/Kgdrywt	1	5	5.5	1.5	2.8
4-Methyl-2-Pentanone	U	14.	ug/Kgdrywt	1	29	32.	6.5	14.
Tetrachloroethene	U	2.8	ug/Kgdrywt	1	6	6.6	1.3	2.8
trans-1,3-Dichloropropene	U	2.8	ug/Kgdrywt	1	7	7.7	0.95	2.8
1,1,2-Trichloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
Dibromochloromethane	U	2.8	ug/Kgdrywt	1	5	5.5	1.1	2.8
1,2-Dibromoethane	U	2.8	ug/Kgdrywt	1	6	6.6	1.3	2.8
2-Hexanone	U	14.	ug/Kgdrywt	1	25	28.	5.3	14.

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-4 ~~SS~~ OL
Client ID: PQIR-~~SB~~02-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 86.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.56	2.8
Ethylbenzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.6	2.8
m+p-Xylenes	U	5.5	ug/Kgdrywt	1	11	12.	1.9	5.5
o-Xylene	U	2.8	ug/Kgdrywt	1	5	5.5	1.4	2.8
Styrene	U	2.8	ug/Kgdrywt	1	5	5.5	0.56	2.8
Bromoform	U	2.8	ug/Kgdrywt	1	5	5.5	0.77	2.8
Isopropylbenzene	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
1,1,2,2-Tetrachloroethane	U	2.8	ug/Kgdrywt	1	5	5.5	0.92	2.8
1,3-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.68	2.8
1,4-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.48	2.8
1,2-Dichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.86	2.8
1,2-Dibromo-3-Chloropropane	U	2.8	ug/Kgdrywt	1	7	7.7	0.96	2.8
1,2,4-Trichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.87	2.8
1,2,3-Trichlorobenzene	U	2.8	ug/Kgdrywt	1	5	5.5	0.84	2.8
Methyl Acetate	U	3.3	ug/Kgdrywt	1	14	15.	3.0	3.3
Methylcyclohexane	U	2.8	ug/Kgdrywt	1	5	5.5	1.0	2.8
p-Bromofluorobenzene		102.	%					
Toluene-D8		112.	%					
1,2-Dichloroethane-D4		118.	%					
Dibromofluoromethane		116.	%					

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Report of Analytical Results

received CK 10/25/10

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date:
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 82.
Report Date: 21-OCT-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.1	6.0
Chloromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.7	6.0
Vinyl Chloride	U	6.0	ug/Kgdrywt	1	10	12.	1.0	6.0
Bromomethane	U	6.0	ug/Kgdrywt	1	10	12.	1.3	6.0
Chloroethane	U	6.0	ug/Kgdrywt	1	10	12.	1.6	6.0
Trichlorofluoromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.1	6.0
1,1-Dichloroethene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
Carbon Disulfide	~~J~~ U	~~2.1~~ 3.0	ug/Kgdrywt	1	6	7.2	0.94	3.0 MBL
Freon-113	U	3.0	ug/Kgdrywt	1	6	7.2	1.1	3.0
Methylene Chloride	U	15.	ug/Kgdrywt	1	25	30.	9.5	15.
Acetone		42.	ug/Kgdrywt	1	33	40.	6.1	15.
trans-1,2-Dichloroethene	U	3.0	ug/Kgdrywt	1	7	8.4	0.85	3.0
Methyl tert-butyl Ether	U	3.0	ug/Kgdrywt	1	9	11.	1.3	3.0
1,1-Dichloroethane	U	3.0	ug/Kgdrywt	1	6	7.2	2.0	3.0
cis-1,2-Dichloroethene	U	3.0	ug/Kgdrywt	1	7	8.4	1.1	3.0
Bromochloromethane	U	3.0	ug/Kgdrywt	1	6	7.2	1.1	3.0
Chloroform	U	3.0	ug/Kgdrywt	1	6	7.2	0.42	3.0
Carbon Tetrachloride	U	3.0	ug/Kgdrywt	1	5	6.0	1.6	3.0
1,1,1-Trichloroethane	U	3.0	ug/Kgdrywt	1	6	7.2	0.50	3.0
2-Butanone	U	15.	ug/Kgdrywt	1	29	35.	7.1	15.
Benzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
Cyclohexane	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
1,2-Dichloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
Trichloroethene	U	3.0	ug/Kgdrywt	1	6	7.2	0.71	3.0
1,2-Dichloropropane	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
Bromodichloromethane	U	3.0	ug/Kgdrywt	1	5	6.0	0.72	3.0
cis-1,3-Dichloropropene	U	3.0	ug/Kgdrywt	1	5	6.0	0.86	3.0
Toluene	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
4-Methyl-2-Pentanone	U	15.	ug/Kgdrywt	1	29	35.	7.1	15.
Tetrachloroethene	U	3.0	ug/Kgdrywt	1	6	7.2	1.4	3.0
trans-1,3-Dichloropropene	U	3.0	ug/Kgdrywt	1	7	8.4	1.0	3.0
1,1,2-Trichloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
Dibromochloromethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
1,2-Dibromoethane	U	3.0	ug/Kgdrywt	1	6	7.2	1.4	3.0
2-Hexanone	U	15.	ug/Kgdrywt	1	25	30.	5.8	15.

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CK 10/28/10

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REISSUE

Katahdin
ANALYTICAL SERVICES

Cert No E87604

received 10/25/10

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date:
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 82.
Report Date: 21-OCT-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.61	3.0
Ethylbenzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.8	3.0
m+p-Xylenes	U	6.0	ug/Kgdrywt	1	11	13.	2.0	6.0
o-Xylene	U	3.0	ug/Kgdrywt	1	5	6.0	1.6	3.0
Styrene	U	3.0	ug/Kgdrywt	1	5	6.0	0.61	3.0
Bromoform	U	3.0	ug/Kgdrywt	1	5	6.0	0.84	3.0
Isopropylbenzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
1,1,2,2-Tetrachloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.0	3.0
1,3-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.74	3.0
1,4-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.53	3.0
1,2-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.94	3.0
1,2-Dibromo-3-Chloropropane	U	3.0	ug/Kgdrywt	1	7	8.4	1.0	3.0
1,2,4-Trichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.95	3.0
1,2,3-Trichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.91	3.0
Methyl Acetate	U	3.6	ug/Kgdrywt	1	14	17.	3.2	3.6
Methylcyclohexane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
p-Bromofluorobenzene		90.6	%					
Toluene-D8		106.	%					
1,2-Dichloroethane-D4		111.	%					
Dibromofluoromethane		110.	%					

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REISSUE

Katahdin
ANALYTICAL SERVICES

Accredited in accordance with nelac
Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5B
Client ID: QIR-SS02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 82.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.1	6.0
Chloromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.7	6.0
Vinyl Chloride	U	6.0	ug/Kgdrywt	1	10	12.	1.0	6.0
Bromomethane	U	6.0	ug/Kgdrywt	1	10	12.	1.3	6.0
Chloroethane	U	6.0	ug/Kgdrywt	1	10	12.	1.6	6.0
Trichlorofluoromethane	U	6.0	ug/Kgdrywt	1	10	12.	1.1	6.0
1,1-Dichloroethene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
Carbon Disulfide	J	2.1	ug/Kgdrywt	1	6	7.2	0.94	3.0
Freon-113	U	3.0	ug/Kgdrywt	1	6	7.2	1.1	3.0
Methylene Chloride	U	15.	ug/Kgdrywt	1	25	30.	9.5	15.
Acetone		42.	ug/Kgdrywt	1	33	40.	6.1	15.
trans-1,2-Dichloroethene	U	3.0	ug/Kgdrywt	1	7	8.4	0.85	3.0
Methyl tert-butyl Ether	U	3.0	ug/Kgdrywt	1	9	11.	1.3	3.0
1,1-Dichloroethane	U	3.0	ug/Kgdrywt	1	6	7.2	2.0	3.0
cis-1,2-Dichloroethene	U	3.0	ug/Kgdrywt	1	7	8.4	1.1	3.0
Bromochloromethane	U	3.0	ug/Kgdrywt	1	6	7.2	1.1	3.0
Chloroform	U	3.0	ug/Kgdrywt	1	6	7.2	0.42	3.0
Carbon Tetrachloride	U	3.0	ug/Kgdrywt	1	5	6.0	1.6	3.0
1,1,1-Trichloroethane	U	3.0	ug/Kgdrywt	1	6	7.2	0.50	3.0
2-Butanone	U	15.	ug/Kgdrywt	1	29	35.	7.1	15.
Benzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
Cyclohexane	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
1,2-Dichloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
Trichloroethene	U	3.0	ug/Kgdrywt	1	6	7.2	0.71	3.0
1,2-Dichloropropane	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
Bromodichloromethane	U	3.0	ug/Kgdrywt	1	5	6.0	0.72	3.0
cis-1,3-Dichloropropene	U	3.0	ug/Kgdrywt	1	5	6.0	0.86	3.0
Toluene	U	3.0	ug/Kgdrywt	1	5	6.0	1.7	3.0
4-Methyl-2-Pentanone	U	15.	ug/Kgdrywt	1	29	35.	7.1	15.
Tetrachloroethene	U	3.0	ug/Kgdrywt	1	6	7.2	1.4	3.0
trans-1,3-Dichloropropene	U	3.0	ug/Kgdrywt	1	7	8.4	1.0	3.0
1,1,2-Trichloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
Dibromochloromethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
1,2-Dibromoethane	U	3.0	ug/Kgdrywt	1	6	7.2	1.4	3.0
2-Hexanone	U	15.	ug/Kgdrywt	1	25	30.	5.8	15.

OR 10/24/10

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5B
Client ID: QIR-SS02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 82.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.61	3.0
Ethylbenzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.8	3.0
m+p-Xylenes	U	6.0	ug/Kgdrywt	1	11	13.	2.0	6.0
o-Xylene	U	3.0	ug/Kgdrywt	1	5	6.0	1.6	3.0
Styrene	U	3.0	ug/Kgdrywt	1	5	6.0	0.61	3.0
Bromoform	U	3.0	ug/Kgdrywt	1	5	6.0	0.84	3.0
Isopropylbenzene	U	3.0	ug/Kgdrywt	1	5	6.0	1.1	3.0
1,1,2,2-Tetrachloroethane	U	3.0	ug/Kgdrywt	1	5	6.0	1.0	3.0
1,3-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.74	3.0
1,4-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.53	3.0
1,2-Dichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.94	3.0
1,2-Dibromo-3-Chloropropane	U	3.0	ug/Kgdrywt	1	7	8.4	1.0	3.0
1,2,4-Trichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.95	3.0
1,2,3-Trichlorobenzene	U	3.0	ug/Kgdrywt	1	5	6.0	0.91	3.0
Methyl Acetate	U	3.6	ug/Kgdrywt	1	14	17.	3.2	3.6
Methylcyclohexane	U	3.0	ug/Kgdrywt	1	5	6.0	1.2	3.0
p-Bromofluorobenzene		90.6	%					
Toluene-D8		106.	%					
1,2-Dichloroethane-D4		111.	%					
Dibromofluoromethane		110.	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 84.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	5.0	ug/Kgdrywt	1	10	10.	0.92	5.0
Chloromethane	U	5.0	ug/Kgdrywt	1	10	10.	1.4	5.0
Vinyl Chloride	U	5.0	ug/Kgdrywt	1	10	10.	0.87	5.0
Bromomethane	U	5.0	ug/Kgdrywt	1	10	10.	1.1	5.0
Chloroethane	U	5.0	ug/Kgdrywt	1	10	10.	1.3	5.0
Trichlorofluoromethane	U	5.0	ug/Kgdrywt	1	10	10.	0.91	5.0
1,1-Dichloroethene	U	2.5	ug/Kgdrywt	1	5	5.0	0.93	2.5
Carbon Disulfide	~~J~~ U	~~1.8~~ 2.5	ug/Kgdrywt	1	6	6.0	0.78	2.5 MBL
Freon-113	U	2.5	ug/Kgdrywt	1	6	6.0	0.90	2.5
Methylene Chloride	U	12.	ug/Kgdrywt	1	25	25.	7.9	12.
Acetone	J	7.3	ug/Kgdrywt	1	33	33.	5.1	12.
trans-1,2-Dichloroethene	U	2.5	ug/Kgdrywt	1	7	7.0	0.71	2.5
Methyl tert-butyl Ether	U	2.5	ug/Kgdrywt	1	9	9.0	1.1	2.5
1,1-Dichloroethane	U	2.5	ug/Kgdrywt	1	6	6.0	1.7	2.5
cis-1,2-Dichloroethene	U	2.5	ug/Kgdrywt	1	7	7.0	0.91	2.5
Bromochloromethane	U	2.5	ug/Kgdrywt	1	6	6.0	0.91	2.5
Chloroform	U	2.5	ug/Kgdrywt	1	6	6.0	0.35	2.5
Carbon Tetrachloride	U	2.5	ug/Kgdrywt	1	5	5.0	1.3	2.5
1,1,1-Trichloroethane	U	2.5	ug/Kgdrywt	1	6	6.0	0.42	2.5
2-Butanone	U	12.	ug/Kgdrywt	1	29	29.	5.9	12.
Benzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.92	2.5
Cyclohexane	U	2.5	ug/Kgdrywt	1	5	5.0	1.4	2.5
1,2-Dichloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	1.0	2.5
Trichloroethene	U	2.5	ug/Kgdrywt	1	6	6.0	0.59	2.5
1,2-Dichloropropane	U	2.5	ug/Kgdrywt	1	5	5.0	1.4	2.5
Bromodichloromethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.60	2.5
cis-1,3-Dichloropropene	U	2.5	ug/Kgdrywt	1	5	5.0	0.72	2.5
Toluene	J	1.9	ug/Kgdrywt	1	5	5.0	1.4	2.5
4-Methyl-2-Pentanone	U	12.	ug/Kgdrywt	1	29	29.	5.9	12.
Tetrachloroethene	U	2.5	ug/Kgdrywt	1	6	6.0	1.2	2.5
trans-1,3-Dichloropropene	U	2.5	ug/Kgdrywt	1	7	7.0	0.86	2.5
1,1,2-Trichloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.97	2.5
Dibromochloromethane	U	2.5	ug/Kgdrywt	1	5	5.0	1.0	2.5
1,2-Dibromoethane	U	2.5	ug/Kgdrywt	1	6	6.0	1.2	2.5
2-Hexanone	U	12.	ug/Kgdrywt	1	25	25.	4.8	12.

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81025

Analysis Date: 16-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 84.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.51	2.5
Ethylbenzene	U	2.5	ug/Kgdrywt	1	5	5.0	1.5	2.5
m+p-Xylenes	U	5.0	ug/Kgdrywt	1	11	11.	1.7	5.0
o-Xylene	U	2.5	ug/Kgdrywt	1	5	5.0	1.3	2.5
Styrene	U	2.5	ug/Kgdrywt	1	5	5.0	0.51	2.5
Bromoform	U	2.5	ug/Kgdrywt	1	5	5.0	0.70	2.5
Isopropylbenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.92	2.5
1,1,2,2-Tetrachloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.84	2.5
1,3-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.62	2.5
1,4-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.44	2.5
1,2-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.78	2.5
1,2-Dibromo-3-Chloropropane	U	2.5	ug/Kgdrywt	1	7	7.0	0.87	2.5
1,2,4-Trichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.79	2.5
1,2,3-Trichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.76	2.5
Methyl Acetate	U	3.0	ug/Kgdrywt	1	14	14.	2.7	3.0
Methylcyclohexane	U	2.5	ug/Kgdrywt	1	5	5.0	0.96	2.5
p-Bromofluorobenzene		96.4	%					
Toluene-D8		109.	%					
1,2-Dichloroethane-D4		119.	%					
Dibromofluoromethane		116.	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-9
Client ID: PQIR-SB01-0810-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 17-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81122

Analysis Date: 17-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 86.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	5.0	ug/Kgdrywt	1	10	10.	0.92	5.0
Chloromethane	U	5.0	ug/Kgdrywt	1	10	10.	1.4	5.0
Vinyl Chloride	U	5.0	ug/Kgdrywt	1	10	10.	0.87	5.0
Bromomethane	U J	5.0	ug/Kgdrywt	1	10	10.	1.1	5.0 CCL
Chloroethane	U	5.0	ug/Kgdrywt	1	10	10.	1.3	5.0
Trichlorofluoromethane	U	5.0	ug/Kgdrywt	1	10	10.	0.91	5.0
1,1-Dichloroethene	U	2.5	ug/Kgdrywt	1	5	5.0	0.93	2.5
Carbon Disulfide	~~J~~ U	~~2.0~~ 2.5	ug/Kgdrywt	1	6	6.0	0.78	2.5 MBL
Freon-113	U	2.5	ug/Kgdrywt	1	6	6.0	0.90	2.5
Methylene Chloride	U	12.	ug/Kgdrywt	1	25	25.	7.9	12.
Acetone		34.	ug/Kgdrywt	1	33	33.	5.1	12.
trans-1,2-Dichloroethene	U	2.5	ug/Kgdrywt	1	7	7.0	0.71	2.5
Methyl tert-butyl Ether	U	2.5	ug/Kgdrywt	1	9	9.0	1.1	2.5
1,1-Dichloroethane	U	2.5	ug/Kgdrywt	1	6	6.0	1.7	2.5
cis-1,2-Dichloroethene	U	2.5	ug/Kgdrywt	1	7	7.0	0.91	2.5
Bromochloromethane	U	2.5	ug/Kgdrywt	1	6	6.0	0.91	2.5
Chloroform	U	2.5	ug/Kgdrywt	1	6	6.0	0.35	2.5
Carbon Tetrachloride	U	2.5	ug/Kgdrywt	1	5	5.0	1.3	2.5
1,1,1-Trichloroethane	U	2.5	ug/Kgdrywt	1	6	6.0	0.42	2.5
2-Butanone	U	12.	ug/Kgdrywt	1	29	29.	5.9	12.
Benzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.92	2.5
Cyclohexane	U	2.5	ug/Kgdrywt	1	5	5.0	1.4	2.5
1,2-Dichloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	1.0	2.5
Trichloroethene	U	2.5	ug/Kgdrywt	1	6	6.0	0.59	2.5
1,2-Dichloropropane	U	2.5	ug/Kgdrywt	1	5	5.0	1.4	2.5
Bromodichloromethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.60	2.5
cis-1,3-Dichloropropene	U	2.5	ug/Kgdrywt	1	5	5.0	0.72	2.5
Toluene	U	2.5	ug/Kgdrywt	1	5	5.0	1.4	2.5
4-Methyl-2-Pentanone	U	12.	ug/Kgdrywt	1	29	29.	5.9	12.
Tetrachloroethene	U	2.5	ug/Kgdrywt	1	6	6.0	1.2	2.5
trans-1,3-Dichloropropene	U	2.5	ug/Kgdrywt	1	7	7.0	0.86	2.5
1,1,2-Trichloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.97	2.5
Dibromochloromethane	U	2.5	ug/Kgdrywt	1	5	5.0	1.0	2.5
1,2-Dibromoethane	U	2.5	ug/Kgdrywt	1	6	6.0	1.2	2.5
2-Hexanone	U	12.	ug/Kgdrywt	1	25	25.	4.8	12.

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-9
Client ID: PQIR-SB01-0810-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 17-AUG-10
Extracted By: JSS
Extraction Method:
Lab Prep Batch: WG81122

Analysis Date: 17-AUG-10
Analyst: JSS
Analysis Method: SW846 8260B
Matrix: SL
% Solids: 86.
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.51	2.5
Ethylbenzene	U	2.5	ug/Kgdrywt	1	5	5.0	1.5	2.5
m+p-Xylenes	U	5.0	ug/Kgdrywt	1	11	11.	1.7	5.0
o-Xylene	U	2.5	ug/Kgdrywt	1	5	5.0	1.3	2.5
Styrene	U	2.5	ug/Kgdrywt	1	5	5.0	0.51	2.5
Bromoform	U	2.5	ug/Kgdrywt	1	5	5.0	0.70	2.5
Isopropylbenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.92	2.5
1,1,2,2-Tetrachloroethane	U	2.5	ug/Kgdrywt	1	5	5.0	0.84	2.5
1,3-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.62	2.5
1,4-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.44	2.5
1,2-Dichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.78	2.5
1,2-Dibromo-3-Chloropropane	U	2.5	ug/Kgdrywt	1	7	7.0	0.87	2.5
1,2,4-Trichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.79	2.5
1,2,3-Trichlorobenzene	U	2.5	ug/Kgdrywt	1	5	5.0	0.76	2.5
Methyl Acetate	U	3.0	ug/Kgdrywt	1	14	14.	2.7	3.0
Methylcyclohexane	U	2.5	ug/Kgdrywt	1	5	5.0	0.96	2.5
p-Bromofluorobenzene		92.9	%					
Toluene-D8		99.4	%					
1,2-Dichloroethane-D4		97.3	%					
Dibromofluoromethane		99.3	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-2
Client ID: VEPQIR-EB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81157

Analysis Date: 19-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	J	0.42	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Freon-113	U	0.50	ug/L	1	2.2	2.2	0.31	0.50
Acetone	U	2.5	ug/L	1	6.3	6.3	2.2	2.5
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl Acetate	U	0.75	ug/L	1	2.4	2.4	0.53	0.75
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1.1	1.1	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1.5	1.5	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Cyclohexane	U	0.50	ug/L	1	1.2	1.2	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1.1	1.1	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1.2	1.2	0.28	0.50
Methylcyclohexane	U	0.50	ug/L	1	1.2	1.2	0.30	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1.2	1.2	0.40	0.50
2-Hexanone	U	2.5	ug/L	1	5.1	5.1	1.7	2.5
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-2
Client ID: VEPQIR-EB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81157

Analysis Date: 19-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50
M+P-Xylenes	U	1.0	ug/L	1	2.1	2.1	0.59	1.0
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1.2	1.2	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1.1	1.1	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	2	2.0	0.50	0.75
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.37	0.50
Bromochloromethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
1,2,3-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.27	0.50
1,2-Dichloroethane-d4		106.	%					
Toluene-d8		108.	%					
P-Bromofluorobenzene		100.	%					
Dibromofluoromethane		106.	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-7
Client ID: VEPQIR-EB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 20-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81225

Analysis Date: 20-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	J	0.56	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Freon-113	U	0.50	ug/L	1	2.2	2.2	0.31	0.50
Acetone	U	2.5	ug/L	1	6.3	6.3	2.2	2.5
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl Acetate	U	0.75	ug/L	1	2.4	2.4	0.53	0.75
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1.1	1.1	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1.5	1.5	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Cyclohexane	U	0.50	ug/L	1	1.2	1.2	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1.1	1.1	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1.2	1.2	0.28	0.50
Methylcyclohexane	U	0.50	ug/L	1	1.2	1.2	0.30	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1.2	1.2	0.40	0.50
2-Hexanone	U	2.5	ug/L	1	5.1	5.1	1.7	2.5
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-7
Client ID: VEPQIR-EB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 20-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81225

Analysis Date: 20-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50
M+P-Xylenes	U	1.0	ug/L	1	2.1	2.1	0.59	1.0
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1.2	1.2	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1.1	1.1	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	2	2.0	0.50	0.75
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.37	0.50
Bromochloromethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
1,2,3-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.27	0.50
1,2-Dichloroethane-d4		87.9	%					
Toluene-d8		97.3	%					
P-Bromofluorobenzene		90.9	%					
Dibromofluoromethane		87.5	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-1
Client ID: VEPQIR-TB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81157

Analysis Date: 19-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	J	0.43	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Freon-113	U	0.50	ug/L	1	2.2	2.2	0.31	0.50
Acetone	U	2.5	ug/L	1	6.3	6.3	2.2	2.5
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl Acetate	U	0.75	ug/L	1	2.4	2.4	0.53	0.75
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1.1	1.1	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1.5	1.5	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Cyclohexane	U	0.50	ug/L	1	1.2	1.2	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1.1	1.1	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1.2	1.2	0.28	0.50
Methylcyclohexane	U	0.50	ug/L	1	1.2	1.2	0.30	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1.2	1.2	0.40	0.50
2-Hexanone	U	2.5	ug/L	1	5.1	5.1	1.7	2.5
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-1
Client ID: VEPQIR-TB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81157

Analysis Date: 19-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50
M+P-Xylenes	U	1.0	ug/L	1	2.1	2.1	0.59	1.0
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1.2	1.2	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1.1	1.1	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	2	2.0	0.50	0.75
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.37	0.50
Bromochloromethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
1,2,3-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.27	0.50
1,2-Dichloroethane-d4		98.2	%					
Toluene-d8		101.	%					
P-Bromofluorobenzene		93.0	%					
Dibromofluoromethane		97.3	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-6
Client ID: VEPQIR-TB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 20-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81225

Analysis Date: 20-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
Chloromethane	U	1.0	ug/L	1	2	2.0	0.36	1.0
Vinyl Chloride	U	1.0	ug/L	1	2	2.0	0.25	1.0
Bromomethane	U	1.0	ug/L	1	2	2.0	0.49	1.0
Chloroethane	U	1.0	ug/L	1	2	2.0	0.55	1.0
Trichlorofluoromethane	U	1.0	ug/L	1	2	2.0	0.24	1.0
1,1-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.35	0.50
Freon-113	U	0.50	ug/L	1	2.2	2.2	0.31	0.50
Acetone	U	2.5	ug/L	1	6.3	6.3	2.2	2.5
Carbon Disulfide	U	0.50	ug/L	1	1	1.0	0.25	0.50
Methyl Acetate	U	0.75	ug/L	1	2.4	2.4	0.53	0.75
Methylene Chloride	U	2.5	ug/L	1	5	5.0	1.1	2.5
trans-1,2-Dichloroethene	U	0.50	ug/L	1	1.1	1.1	0.25	0.50
Methyl tert-butyl Ether	U	0.50	ug/L	1	1.5	1.5	0.36	0.50
1,1-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
cis-1,2-Dichloroethene	U	0.50	ug/L	1	1	1.0	0.21	0.50
2-Butanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Chloroform	U	0.50	ug/L	1	1	1.0	0.32	0.50
1,1,1-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Cyclohexane	U	0.50	ug/L	1	1.2	1.2	0.31	0.50
Carbon Tetrachloride	U	0.50	ug/L	1	1.1	1.1	0.22	0.50
Benzene	U	0.50	ug/L	1	1	1.0	0.26	0.50
1,2-Dichloroethane	U	0.50	ug/L	1	1	1.0	0.20	0.50
Trichloroethene	U	0.50	ug/L	1	1.2	1.2	0.28	0.50
Methylcyclohexane	U	0.50	ug/L	1	1.2	1.2	0.30	0.50
1,2-Dichloropropane	U	0.50	ug/L	1	1	1.0	0.25	0.50
Bromodichloromethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
cis-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.19	0.50
4-Methyl-2-Pentanone	U	2.5	ug/L	1	5	5.0	1.3	2.5
Toluene	U	0.50	ug/L	1	1	1.0	0.27	0.50
trans-1,3-Dichloropropene	U	0.50	ug/L	1	1	1.0	0.20	0.50
1,1,2-Trichloroethane	U	0.50	ug/L	1	1	1.0	0.33	0.50
Tetrachloroethene	U	0.50	ug/L	1	1.2	1.2	0.40	0.50
2-Hexanone	U	2.5	ug/L	1	5.1	5.1	1.7	2.5
Dibromochloromethane	U	0.50	ug/L	1	1	1.0	0.30	0.50

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10/24/10

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-6
Client ID: VEPQIR-TB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 20-AUG-10
Extracted By: TTC
Extraction Method:
Lab Prep Batch: WG81225

Analysis Date: 20-AUG-10
Analyst: TTC
Analysis Method: SW846 8260B
Matrix: AQ
% Solids: NA
Report Date: 02-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
1,2-Dibromoethane	U	0.50	ug/L	1	1	1.0	0.22	0.50
Chlorobenzene	U	0.50	ug/L	1	1	1.0	0.22	0.50
Ethylbenzene	U	0.50	ug/L	1	1	1.0	0.21	0.50
M+P-Xylenes	U	1.0	ug/L	1	2.1	2.1	0.59	1.0
o-Xylene	U	0.50	ug/L	1	1	1.0	0.25	0.50
Styrene	U	0.50	ug/L	1	1	1.0	0.23	0.50
Bromoform	U	0.50	ug/L	1	1.2	1.2	0.23	0.50
Isopropylbenzene	U	0.50	ug/L	1	1.1	1.1	0.23	0.50
1,1,2,2-Tetrachloroethane	U	0.50	ug/L	1	1	1.0	0.38	0.50
1,3-Dichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.26	0.50
1,4-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.24	0.50
1,2-Dichlorobenzene	U	0.50	ug/L	1	1	1.0	0.15	0.50
1,2-Dibromo-3-Chloropropane	U	0.75	ug/L	1	2	2.0	0.50	0.75
1,2,4-Trichlorobenzene	U	0.50	ug/L	1	1.1	1.1	0.37	0.50
Bromochloromethane	U	0.50	ug/L	1	1	1.0	0.21	0.50
1,2,3-Trichlorobenzene	U	0.50	ug/L	1	1	1.0	0.27	0.50
1,2-Dichloroethane-d4		87.5	%					
Toluene-d8		97.8	%					
P-Bromofluorobenzene		92.9	%					
Dibromofluoromethane		87.3	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-3
Client ID: PQIR-SS02-0304-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 27-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 81.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	290	ug/Kgdrywt	1	468	550	180	290
Bis(2-Chloroethyl) Ether	U	290	ug/Kgdrywt	1	330	390	95.	290
2-Chlorophenol	U	290	ug/Kgdrywt	1	492	580	190	290
2-Methylphenol	U	290	ug/Kgdrywt	1	600	700	230	290
Bis(2-Chloroisopropyl)Ether	U	290	ug/Kgdrywt	1	330	390	100	290
N-Nitroso-Di-N-Propylamine	U	290	ug/Kgdrywt	1	330	390	97.	290
Nitrobenzene	U	290	ug/Kgdrywt	1	330	390	110	290
Isophorone	U	290	ug/Kgdrywt	1	330	390	88.	290
2-Nitrophenol	U	290	ug/Kgdrywt	1	501	590	200	290
2,4-Dimethylphenol	U	290	ug/Kgdrywt	1	495	580	190	290
Bis(2-Chloroethoxy) Methane	U	290	ug/Kgdrywt	1	330	390	110	290
2,4-Dichlorophenol	U	290	ug/Kgdrywt	1	450	530	180	290
4-Chloroaniline	U	290	ug/Kgdrywt	1	357	420	140	290
Hexachlorobutadiene	U	290	ug/Kgdrywt	1	330	390	97.	290
4-Chloro-3-Methylphenol	U	290	ug/Kgdrywt	1	498	580	190	290
Hexachlorocyclopentadiene	U	290	ug/Kgdrywt	1	330	390	96.	290
2,4,6-Trichlorophenol	U	290	ug/Kgdrywt	1	465	540	180	290
2,4,5-Trichlorophenol	U	720	ug/Kgdrywt	1	820	960	180	720
2-Nitroaniline	U	720	ug/Kgdrywt	1	820	960	88.	720
Dimethyl Phthalate	U	290	ug/Kgdrywt	1	330	390	91.	290
2,6-Dinitrotoluene	U	290	ug/Kgdrywt	1	330	390	92.	290
3-Nitroaniline	U	720	ug/Kgdrywt	1	820	960	110	720
2,4-Dinitrophenol	U	720	ug/Kgdrywt	1	1131	1300	440	720
4-Nitrophenol	U	720	ug/Kgdrywt	1	927	1100	360	720
Dibenzofuran	U	290	ug/Kgdrywt	1	330	390	92.	290
2,4-Dinitrotoluene	U	290	ug/Kgdrywt	1	330	390	99.	290
Diethylphthalate	U	290	ug/Kgdrywt	1	330	390	94.	290
4-Chlorophenyl-Phenylether	U	290	ug/Kgdrywt	1	330	390	91.	290
4-Nitroaniline	U	720	ug/Kgdrywt	1	820	960	160	720
4,6-Dinitro-2-Methylphenol	U	720	ug/Kgdrywt	1	1011	1200	390	720
N-Nitrosodiphenylamine/DPA	U	290	ug/Kgdrywt	1	657	770	260	290
4-Bromophenyl-Phenylether	U	290	ug/Kgdrywt	1	330	390	99.	290
Butylbenzylphthalate	U	290	ug/Kgdrywt	1	330	390	110	290
3,3'-Dichlorobenzidine	U	290	ug/Kgdrywt	1	342	400	130	290
Di-N-Octylphthalate	U	290	ug/Kgdrywt	1	633	740	250	290

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-3
Client ID: PQIR-SS02-0304-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 27-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 81.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD	
Acetophenone	U	290	ug/Kgdrywt	1	534	620	210	290	
1,2,4,5-Tetrachlorobenzene	U	290	ug/Kgdrywt	1	405	470	160	290	
2,3,4,6-Tetrachlorophenol	U	290	ug/Kgdrywt	1	420	490	160	290	
Benzaldehyde	~~U~~ R	290	ug/Kgdrywt	1	360	420	140	290	CCH
3&4-Methylphenol	U	290	ug/Kgdrywt	1	561	660	220	290	
Caprolactam	U	290	ug/Kgdrywt	1	432	500	170	290	
1,1'-Biphenyl	U	290	ug/Kgdrywt	1	330	390	85.	290	
Atrazine	U	290	ug/Kgdrywt	1	330	390	110	290	
2-Fluorophenol		89.5	%						
Phenol-d6		96.7	%						
Nitrobenzene-d5		87.2	%						
2-Fluorobiphenyl		91.3	%						
2,4,6-Tribromophenol		81.0	%						
Terphenyl-d14		100.	%						

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-4
Client ID: PQIR-SB02-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 27-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	270	ug/Kgdrywt	1	468	520	170	270
Bis(2-Chloroethyl) Ether	U	270	ug/Kgdrywt	1	330	360	90.	270
2-Chlorophenol	U	270	ug/Kgdrywt	1	492	540	180	270
2-Methylphenol	U	270	ug/Kgdrywt	1	600	660	220	270
Bis(2-Chloroisopropyl)Ether	U	270	ug/Kgdrywt	1	330	360	98.	270
N-Nitroso-Di-N-Propylamine	U	270	ug/Kgdrywt	1	330	360	92.	270
Nitrobenzene	U	270	ug/Kgdrywt	1	330	360	100	270
Isophorone	U	270	ug/Kgdrywt	1	330	360	83.	270
2-Nitrophenol	U	270	ug/Kgdrywt	1	501	550	180	270
2,4-Dimethylphenol	U	270	ug/Kgdrywt	1	495	550	180	270
Bis(2-Chloroethoxy) Methane	U	270	ug/Kgdrywt	1	330	360	110	270
2,4-Dichlorophenol	U	270	ug/Kgdrywt	1	450	500	170	270
4-Chloroaniline	U	270	ug/Kgdrywt	1	357	400	130	270
Hexachlorobutadiene	U	270	ug/Kgdrywt	1	330	360	92.	270
4-Chloro-3-Methylphenol	U	270	ug/Kgdrywt	1	498	550	180	270
Hexachlorocyclopentadiene	U	270	ug/Kgdrywt	1	330	360	91.	270
2,4,6-Trichlorophenol	U	270	ug/Kgdrywt	1	465	510	170	270
2,4,5-Trichlorophenol	U	680	ug/Kgdrywt	1	820	910	170	680
2-Nitroaniline	U	680	ug/Kgdrywt	1	820	910	83.	680
Dimethyl Phthalate	U	270	ug/Kgdrywt	1	330	360	86.	270
2,6-Dinitrotoluene	U	270	ug/Kgdrywt	1	330	360	87.	270
3-Nitroaniline	U	680	ug/Kgdrywt	1	820	910	100	680
2,4-Dinitrophenol	U	680	ug/Kgdrywt	1	1131	1200	420	680
4-Nitrophenol	U	680	ug/Kgdrywt	1	927	1000	340	680
Dibenzofuran	U	270	ug/Kgdrywt	1	330	360	87.	270
2,4-Dinitrotoluene	U	270	ug/Kgdrywt	1	330	360	94.	270
Diethylphthalate	U	270	ug/Kgdrywt	1	330	360	88.	270
4-Chlorophenyl-Phenylether	U	270	ug/Kgdrywt	1	330	360	86.	270
4-Nitroaniline	U	680	ug/Kgdrywt	1	820	910	150	680
4,6-Dinitro-2-Methylphenol	U	680	ug/Kgdrywt	1	1011	1100	370	680
N-Nitrosodiphenylamine/DPA	U	270	ug/Kgdrywt	1	657	730	240	270
4-Bromophenyl-Phenylether	U	270	ug/Kgdrywt	1	330	360	94.	270
Butylbenzylphthalate	U	270	ug/Kgdrywt	1	330	360	100	270
3,3'-Dichlorobenzidine	U	270	ug/Kgdrywt	1	342	380	130	270
Di-N-Octylphthalate	U	270	ug/Kgdrywt	1	633	700	230	270

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-4
Client ID: PQIR-SB02-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 27-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acetophenone	U	270	ug/Kgdrywt	1	534	590	200	270
1,2,4,5-Tetrachlorobenzene	U	270	ug/Kgdrywt	1	405	450	150	270
2,3,4,6-Tetrachlorophenol	U	270	ug/Kgdrywt	1	420	460	160	270
Benzaldehyde	~~U~~ R	270	ug/Kgdrywt	1	360	400	130	270 CCH
3&4-Methylphenol	U	270	ug/Kgdrywt	1	561	620	210	270
Caprolactam	U	270	ug/Kgdrywt	1	432	480	160	270
1,1'-Biphenyl	U	270	ug/Kgdrywt	1	330	360	81.	270
Atrazine	U	270	ug/Kgdrywt	1	330	360	100	270
2-Fluorophenol		73.4	%					
Phenol-d6		82.6	%					
Nitrobenzene-d5		74.4	%					
2-Fluorobiphenyl		73.9	%					
2,4,6-Tribromophenol		60.2	%					
Terphenyl-d14		84.8	%					

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Report of Analytical Results

received CR 10/28/10

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 28-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 82.
Report Date: 08-OCT-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	300	ug/Kgdrywt	1	468	560	190	300
Bis(2-Chloroethyl) Ether	U	300	ug/Kgdrywt	1	330	390	97.	300
2-Chlorophenol	U	300	ug/Kgdrywt	1	492	590	200	300
2-Methylphenol	U	300	ug/Kgdrywt	1	600	720	240	300
2,2'-Oxybis(1-Chloropropane)	U	300	ug/Kgdrywt	1	330	390	110	300
N-Nitroso-Di-N-Propylamine	U	300	ug/Kgdrywt	1	330	390	99.	300
Nitrobenzene	U	300	ug/Kgdrywt	1	330	390	110	300
Isophorone	U	300	ug/Kgdrywt	1	330	390	89.	300
2-Nitrophenol	U	300	ug/Kgdrywt	1	501	600	200	300
2,4-Dimethylphenol	U	300	ug/Kgdrywt	1	495	590	200	300
Bis(2-Chloroethoxy) Methane	U	300	ug/Kgdrywt	1	330	390	110	300
2,4-Dichlorophenol	U	300	ug/Kgdrywt	1	450	540	180	300
4-Chloroaniline	U	300	ug/Kgdrywt	1	357	420	140	300
Hexachlorobutadiene	U	300	ug/Kgdrywt	1	330	390	99.	300
4-Chloro-3-Methylphenol	U	300	ug/Kgdrywt	1	498	590	200	300
Hexachlorocyclopentadiene	U	300	ug/Kgdrywt	1	330	390	98.	300
2,4,6-Trichlorophenol	U	300	ug/Kgdrywt	1	465	550	180	300
2,4,5-Trichlorophenol	U	730	ug/Kgdrywt	1	820	980	180	730
2-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	89.	730
Dimethyl Phthalate	U	300	ug/Kgdrywt	1	330	390	93.	300
2,6-Dinitrotoluene	U	300	ug/Kgdrywt	1	330	390	94.	300
3-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	110	730
2,4-Dinitrophenol	U	730	ug/Kgdrywt	1	1131	1300	450	730
4-Nitrophenol	U	730	ug/Kgdrywt	1	927	1100	370	730
Dibenzofuran	U	300	ug/Kgdrywt	1	330	390	94.	300
2,4-Dinitrotoluene	U	300	ug/Kgdrywt	1	330	390	100	300
Diethylphthalate	U	300	ug/Kgdrywt	1	330	390	95.	300
4-Chlorophenyl-Phenylether	U	300	ug/Kgdrywt	1	330	390	93.	300
4-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	160	730
4,6-Dinitro-2-Methylphenol	U	730	ug/Kgdrywt	1	1011	1200	400	730
N-Nitrosodiphenylamine	U	300	ug/Kgdrywt	1	657	780	260	300
4-Bromophenyl-Phenylether	U	300	ug/Kgdrywt	1	330	390	100	300
Butylbenzylphthalate	U	300	ug/Kgdrywt	1	330	390	110	300
3,3'-Dichlorobenzidine	U	300	ug/Kgdrywt	1	342	410	140	300
Di-N-Octylphthalate	U	300	ug/Kgdrywt	1	633	750	250	300

CR 10/28/10

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REISSUE

Katahdin
ANALYTICAL SERVICES

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Cert No E87604

Report of Analytical Results

received CR 10/25/10

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 28-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 82.
Report Date: 08-OCT-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD	
Acetophenone	U	300	ug/Kgdrywt	1	534	640	210	300	
1,2,4,5-Tetrachlorobenzene	U	300	ug/Kgdrywt	1	405	480	160	300	
2,3,4,6-Tetrachlorophenol	U	300	ug/Kgdrywt	1	420	500	170	300	
Benzaldehyde	~~U~~ R	300	ug/Kgdrywt	1	360	430	140	300	CCH
3&4-Methylphenol	U	300	ug/Kgdrywt	1	561	670	220	300	
Caprolactam	U	300	ug/Kgdrywt	1	432	520	170	300	
1,1'-Biphenyl	U	300	ug/Kgdrywt	1	330	390	87.	300	
Atrazine	U	300	ug/Kgdrywt	1	330	390	110	300	
2-Fluorophenol		78.9	%						
Phenol-d6		87.2	%						
Nitrobenzene-d5		76.9	%						
2-Fluorobiphenyl		77.9	%						
2,4,6-Tribromophenol		70.4	%						
Terphenyl-d14		95.0	%						

CR 10/28/10

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REISSUE

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SS02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 28-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 82.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	300	ug/Kgdrywt	1	468	560	190	300
Bis(2-Chloroethyl) Ether	U	300	ug/Kgdrywt	1	330	390	97.	300
2-Chlorophenol	U	300	ug/Kgdrywt	1	492	590	200	300
2-Methylphenol	U	300	ug/Kgdrywt	1	600	720	240	300
Bis(2-Chloroisopropyl)Ether	U	300	ug/Kgdrywt	1	330	390	110	300
N-Nitroso-Di-N-Propylamine	U	300	ug/Kgdrywt	1	330	390	99.	300
Nitrobenzene	U	300	ug/Kgdrywt	1	330	390	110	300
Isophorone	U	300	ug/Kgdrywt	1	330	390	89.	300
2-Nitrophenol	U	300	ug/Kgdrywt	1	501	600	200	300
2,4-Dimethylphenol	U	300	ug/Kgdrywt	1	495	590	200	300
Bis(2-Chloroethoxy) Methane	U	300	ug/Kgdrywt	1	330	390	110	300
2,4-Dichlorophenol	U	300	ug/Kgdrywt	1	450	540	180	300
4-Chloroaniline	U	300	ug/Kgdrywt	1	357	420	140	300
Hexachlorobutadiene	U	300	ug/Kgdrywt	1	330	390	99.	300
4-Chloro-3-Methylphenol	U	300	ug/Kgdrywt	1	498	590	200	300
Hexachlorocyclopentadiene	U	300	ug/Kgdrywt	1	330	390	98.	300
2,4,6-Trichlorophenol	U	300	ug/Kgdrywt	1	465	550	180	300
2,4,5-Trichlorophenol	U	730	ug/Kgdrywt	1	820	980	180	730
2-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	89.	730
Dimethyl Phthalate	U	300	ug/Kgdrywt	1	330	390	93.	300
2,6-Dinitrotoluene	U	300	ug/Kgdrywt	1	330	390	94.	300
3-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	110	730
2,4-Dinitrophenol	U	730	ug/Kgdrywt	1	1131	1300	450	730
4-Nitrophenol	U	730	ug/Kgdrywt	1	927	1100	370	730
Dibenzofuran	U	300	ug/Kgdrywt	1	330	390	94.	300
2,4-Dinitrotoluene	U	300	ug/Kgdrywt	1	330	390	100	300
Diethylphthalate	U	300	ug/Kgdrywt	1	330	390	95.	300
4-Chlorophenyl-Phenylether	U	300	ug/Kgdrywt	1	330	390	93.	300
4-Nitroaniline	U	730	ug/Kgdrywt	1	820	980	160	730
4,6-Dinitro-2-Methylphenol	U	730	ug/Kgdrywt	1	1011	1200	400	730
N-Nitrosodiphenylamine/DPA	U	300	ug/Kgdrywt	1	657	780	260	300
4-Bromophenyl-Phenylether	U	300	ug/Kgdrywt	1	330	390	100	300
Butylbenzylphthalate	U	300	ug/Kgdrywt	1	330	390	110	300
3,3'-Dichlorobenzidine	U	300	ug/Kgdrywt	1	342	410	140	300
Di-N-Octylphthalate	U	300	ug/Kgdrywt	1	633	750	250	300

10/26/10

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Katahdin
ANALYTICAL SERVICES

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 28-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 82.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acetophenone	U	300	ug/Kgdrywt	1	534	640	210	300
1,2,4,5-Tetrachlorobenzene	U	300	ug/Kgdrywt	1	405	480	160	300
2,3,4,6-Tetrachlorophenol	U	300	ug/Kgdrywt	1	420	500	170	300
Benzaldehyde	U	300	ug/Kgdrywt	1	360	430	140	300
3&4-Methylphenol	U	300	ug/Kgdrywt	1	561	670	220	300
Caprolactam	U	300	ug/Kgdrywt	1	432	520	170	300
1,1'-Biphenyl	U	300	ug/Kgdrywt	1	330	390	87.	300
Atrazine	U	300	ug/Kgdrywt	1	330	390	110	300
2-Fluorophenol		78.9	%					
Phenol-d6		87.2	%					
Nitrobenzene-d5		76.9	%					
2-Fluorobiphenyl		77.9	%					
2,4,6-Tribromophenol		70.4	%					
Terphenyl-d14		95.0	%					

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 84.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	280	ug/Kgdrywt	1	468	540	180	280
Bis(2-Chloroethyl) Ether	U	280	ug/Kgdrywt	1	330	380	93.	280
2-Chlorophenol	U	280	ug/Kgdrywt	1	492	560	190	280
2-Methylphenol	U	280	ug/Kgdrywt	1	600	690	230	280
Bis(2-Chloroisopropyl)Ether	U	280	ug/Kgdrywt	1	330	380	100	280
N-Nitroso-Di-N-Propylamine	U	280	ug/Kgdrywt	1	330	380	95.	280
Nitrobenzene	U	280	ug/Kgdrywt	1	330	380	100	280
Isophorone	U	280	ug/Kgdrywt	1	330	380	86.	280
2-Nitrophenol	U	280	ug/Kgdrywt	1	501	570	190	280
2,4-Dimethylphenol	U	280	ug/Kgdrywt	1	495	570	190	280
Bis(2-Chloroethoxy) Methane	U	280	ug/Kgdrywt	1	330	380	110	280
2,4-Dichlorophenol	U	280	ug/Kgdrywt	1	450	520	170	280
4-Chloroaniline	U	280	ug/Kgdrywt	1	357	410	140	280
Hexachlorobutadiene	U	280	ug/Kgdrywt	1	330	380	95.	280
4-Chloro-3-Methylphenol	U	280	ug/Kgdrywt	1	498	570	190	280
Hexachlorocyclopentadiene	U	280	ug/Kgdrywt	1	330	380	94.	280
2,4,6-Trichlorophenol	U	280	ug/Kgdrywt	1	465	530	180	280
2,4,5-Trichlorophenol	U	700	ug/Kgdrywt	1	820	940	180	700
2-Nitroaniline	U	700	ug/Kgdrywt	1	820	940	86.	700
Dimethyl Phthalate	U	280	ug/Kgdrywt	1	330	380	89.	280
2,6-Dinitrotoluene	U	280	ug/Kgdrywt	1	330	380	90.	280
3-Nitroaniline	U	700	ug/Kgdrywt	1	820	940	110	700
2,4-Dinitrophenol	U	700	ug/Kgdrywt	1	1131	1300	430	700
4-Nitrophenol	U	700	ug/Kgdrywt	1	927	1100	350	700
Dibenzofuran	U	280	ug/Kgdrywt	1	330	380	90.	280
2,4-Dinitrotoluene	U	280	ug/Kgdrywt	1	330	380	97.	280
Diethylphthalate	U	280	ug/Kgdrywt	1	330	380	92.	280
4-Chlorophenyl-Phenylether	U	280	ug/Kgdrywt	1	330	380	89.	280
4-Nitroaniline	U	700	ug/Kgdrywt	1	820	940	150	700
4,6-Dinitro-2-Methylphenol	U	700	ug/Kgdrywt	1	1011	1200	380	700
N-Nitrosodiphenylamine/DPA	U	280	ug/Kgdrywt	1	657	750	250	280
4-Bromophenyl-Phenylether	U	280	ug/Kgdrywt	1	330	380	97.	280
Butylbenzylphthalate	U	280	ug/Kgdrywt	1	330	380	110	280
3,3'-Dichlorobenzidine	U	280	ug/Kgdrywt	1	342	390	130	280
Di-N-Octylphthalate	U	280	ug/Kgdrywt	1	633	720	240	280

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 84.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acetophenone	U	280	ug/Kgdrywt	1	534	610	200	280
1,2,4,5-Tetrachlorobenzene	U	280	ug/Kgdrywt	1	405	460	150	280
2,3,4,6-Tetrachlorophenol	U	280	ug/Kgdrywt	1	420	480	160	280
Benzaldehyde	U	280	ug/Kgdrywt	1	360	410	140	280
3&4-Methylphenol	U	280	ug/Kgdrywt	1	561	640	210	280
Caprolactam	U	280	ug/Kgdrywt	1	432	490	160	280
1,1'-Biphenyl	U	280	ug/Kgdrywt	1	330	380	84.	280
Atrazine	U	280	ug/Kgdrywt	1	330	380	100	280
2-Fluorophenol		77.0	%					
Phenol-d6		86.9	%					
Nitrobenzene-d5		75.4	%					
2-Fluorobiphenyl		73.3	%					
2,4,6-Tribromophenol		75.6	%					
Terphenyl-d14		84.3	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-9
Client ID: PQIR-SB01-0810-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	260	ug/Kgdrywt	1	468	500	170	260
Bis(2-Chloroethyl) Ether	U	260	ug/Kgdrywt	1	330	350	86.	260
2-Chlorophenol	U	260	ug/Kgdrywt	1	492	520	180	260
2-Methylphenol	U	260	ug/Kgdrywt	1	600	640	210	260
Bis(2-Chloroisopropyl)Ether	U	260	ug/Kgdrywt	1	330	350	95.	260
N-Nitroso-Di-N-Propylamine	U	260	ug/Kgdrywt	1	330	350	89.	260
Nitrobenzene	U	260	ug/Kgdrywt	1	330	350	97.	260
Isophorone	U	260	ug/Kgdrywt	1	330	350	80.	260
2-Nitrophenol	U	260	ug/Kgdrywt	1	501	530	180	260
2,4-Dimethylphenol	U	260	ug/Kgdrywt	1	495	530	180	260
Bis(2-Chloroethoxy) Methane	U	260	ug/Kgdrywt	1	330	350	100	260
2,4-Dichlorophenol	U	260	ug/Kgdrywt	1	450	480	160	260
4-Chloroaniline	U	260	ug/Kgdrywt	1	357	380	130	260
Hexachlorobutadiene	U	260	ug/Kgdrywt	1	330	350	89.	260
4-Chloro-3-Methylphenol	U	260	ug/Kgdrywt	1	498	530	180	260
Hexachlorocyclopentadiene	U	260	ug/Kgdrywt	1	330	350	88.	260
2,4,6-Trichlorophenol	U	260	ug/Kgdrywt	1	465	500	160	260
2,4,5-Trichlorophenol	U	660	ug/Kgdrywt	1	820	880	160	660
2-Nitroaniline	U	660	ug/Kgdrywt	1	820	880	80.	660
Dimethyl Phthalate	U	260	ug/Kgdrywt	1	330	350	83.	260
2,6-Dinitrotoluene	U	260	ug/Kgdrywt	1	330	350	84.	260
3-Nitroaniline	U	660	ug/Kgdrywt	1	820	880	100	660
2,4-Dinitrophenol	U	660	ug/Kgdrywt	1	1131	1200	400	660
4-Nitrophenol	U	660	ug/Kgdrywt	1	927	990	330	660
Dibenzofuran	U	260	ug/Kgdrywt	1	330	350	84.	260
2,4-Dinitrotoluene	U	260	ug/Kgdrywt	1	330	350	91.	260
Diethylphthalate	U	260	ug/Kgdrywt	1	330	350	85.	260
4-Chlorophenyl-Phenylether	U	260	ug/Kgdrywt	1	330	350	83.	260
4-Nitroaniline	U	660	ug/Kgdrywt	1	820	880	140	660
4,6-Dinitro-2-Methylphenol	U	660	ug/Kgdrywt	1	1011	1100	360	660
N-Nitrosodiphenylamine/DPA	U	260	ug/Kgdrywt	1	657	700	230	260
4-Bromophenyl-Phenylether	U	260	ug/Kgdrywt	1	330	350	91.	260
Butylbenzylphthalate	U	260	ug/Kgdrywt	1	330	350	99.	260
3,3'-Dichlorobenzidine	U	260	ug/Kgdrywt	1	342	360	120	260
Di-N-Octylphthalate	U	260	ug/Kgdrywt	1	633	680	220	260

9/26/10

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-9
Client ID: PQIR-SB01-0810-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Acetophenone	U	260	ug/Kgdrywt	1	534	570	190	260
1,2,4,5-Tetrachlorobenzene	U	260	ug/Kgdrywt	1	405	430	140	260
2,3,4,6-Tetrachlorophenol	U	260	ug/Kgdrywt	1	420	450	150	260
Benzaldehyde	U	260	ug/Kgdrywt	1	360	380	130	260
3&4-Methylphenol	U	260	ug/Kgdrywt	1	561	600	200	260
Caprolactam	U	260	ug/Kgdrywt	1	432	460	150	260
1,1'-Biphenyl	U	260	ug/Kgdrywt	1	330	350	78.	260
Atrazine	U	260	ug/Kgdrywt	1	330	350	97.	260
2-Fluorophenol		78.6	%					
Phenol-d6		89.9	%					
Nitrobenzene-d5		77.5	%					
2-Fluorobiphenyl		79.8	%					
2,4,6-Tribromophenol		75.0	%					
Terphenyl-d14		85.4	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-2
Client ID: VEPQIR-EB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80994

Analysis Date: 18-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	7.4	ug/L	1	10	9.8	1.8	7.4
Bis(2-Chloroethyl) Ether	U	7.4	ug/L	1	10	9.8	2.0	7.4
2-Chlorophenol	U	7.4	ug/L	1	11	11.	3.1	7.4
Bis(2-Chloroisopropyl)Ether	U	7.4	ug/L	1	10	9.8	2.0	7.4
2-Methylphenol	U	7.4	ug/L	1	13	13.	3.7	7.4
Acetophenone	U	7.4	ug/L	1	12	12.	3.8	7.4
N-Nitroso-Di-N-Propylamine	U	7.4	ug/L	1	10	9.8	1.9	7.4
3&4-Methylphenol	U	7.4	ug/L	1	10	9.8	5.5	7.4
Nitrobenzene	U	7.4	ug/L	1	10	9.8	3.0	7.4
Isophorone	U	7.4	ug/L	1	10	9.8	1.7	7.4
2-Nitrophenol	U	7.4	ug/L	1	11	11.	2.6	7.4
2,4-Dimethylphenol	U	7.4	ug/L	1	12	12.	2.9	7.4
Bis(2-Chloroethoxy) Methane	U	7.4	ug/L	1	10	9.8	2.0	7.4
2,4-Dichlorophenol	U	7.4	ug/L	1	13	13.	2.9	7.4
4-Chloroaniline	U	7.4	ug/L	1	10	9.8	1.9	7.4
Hexachlorobutadiene	U	7.4	ug/L	1	10	9.8	1.8	7.4
4-Chloro-3-Methylphenol	U	7.4	ug/L	1	10	9.8	3.5	7.4
Hexachlorocyclopentadiene	U	7.4	ug/L	1	10	9.8	1.2	7.4
1,2,4,5-Tetrachlorobenzene	U	7.4	ug/L	1	10	9.8	1.8	7.4
2,4,6-Trichlorophenol	U	7.4	ug/L	1	10	9.8	2.6	7.4
2,4,5-Trichlorophenol	U	18.	ug/L	1	25	24.	3.5	18.
2-Nitroaniline	U	18.	ug/L	1	25	24.	1.8	18.
Dimethyl Phthalate	U	7.4	ug/L	1	10	9.8	2.0	7.4
2,6-Dinitrotoluene	U	7.4	ug/L	1	10	9.8	2.0	7.4
3-Nitroaniline	U	18.	ug/L	1	25	24.	1.5	18.
2,4-Dinitrophenol	U	18.	ug/L	1	45	44.	0.98	18.
Dibenzofuran	U	7.4	ug/L	1	10	9.8	1.6	7.4
4-Nitrophenol	U	18.	ug/L	1	25	24.	1.8	18.
2,4-Dinitrotoluene	U	7.4	ug/L	1	10	9.8	2.2	7.4
2,3,4,6-Tetrachlorophenol	U	7.4	ug/L	1	10	9.8	2.6	7.4
Diethylphthalate	U	7.4	ug/L	1	10	9.8	2.0	7.4
4-Chlorophenyl-Phenylether	U	7.4	ug/L	1	10	9.8	2.2	7.4
4-Nitroaniline	U	18.	ug/L	1	25	24.	1.6	18.
4,6-Dinitro-2-Methylphenol	U	18.	ug/L	1	25	24.	2.0	18.
N-Nitrosodiphenylamine/DPA	U	7.4	ug/L	1	10	9.8	3.6	7.4

12/26/10

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-2
Client ID: VEPQIR-EB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80994

Analysis Date: 18-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
4-Bromophenyl-Phenylether	U	7.4	ug/L	1	10	9.8	1.9	7.4
Butylbenzylphthalate	U	7.4	ug/L	1	10	9.8	1.9	7.4
3,3'-Dichlorobenzidine	U	7.4	ug/L	1	10	9.8	1.1	7.4
Di-N-Octylphthalate	U	7.4	ug/L	1	10	9.8	1.8	7.4
Benzaldehyde	U	7.4	ug/L	1	10	9.8	0.98	7.4
Caprolactam	U	7.4	ug/L	1	10	9.8	0.39	7.4
1,1'-Biphenyl	U	7.4	ug/L	1	10	9.8	2.6	7.4
Atrazine	U	7.4	ug/L	1	10	9.8	3.2	7.4
2-Fluorophenol		24.6	%					
Phenol-d6		65.4	%					
Nitrobenzene-d5		78.6	%					
2-Fluorobiphenyl		87.9	%					
2,4,6-Tribromophenol		51.7	%					
Terphenyl-d14		110.	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-7
Client ID: VEPQIR-EB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80994

Analysis Date: 18-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Phenol	U	7.4	ug/L	1	10	9.8	1.8	7.4
Bis(2-Chloroethyl) Ether	U	7.4	ug/L	1	10	9.8	2.0	7.4
2-Chlorophenol	U	7.4	ug/L	1	11	11.	3.1	7.4
Bis(2-Chloroisopropyl)Ether	U	7.4	ug/L	1	10	9.8	2.0	7.4
2-Methylphenol	U	7.4	ug/L	1	13	13.	3.7	7.4
Acetophenone	U	7.4	ug/L	1	12	12.	3.8	7.4
N-Nitroso-Di-N-Propylamine	U	7.4	ug/L	1	10	9.8	1.9	7.4
3&4-Methylphenol	U	7.4	ug/L	1	10	9.8	5.5	7.4
Nitrobenzene	U	7.4	ug/L	1	10	9.8	3.0	7.4
Isophorone	U	7.4	ug/L	1	10	9.8	1.7	7.4
2-Nitrophenol	U	7.4	ug/L	1	11	11.	2.6	7.4
2,4-Dimethylphenol	U	7.4	ug/L	1	12	12.	2.9	7.4
Bis(2-Chloroethoxy) Methane	U	7.4	ug/L	1	10	9.8	2.0	7.4
2,4-Dichlorophenol	U	7.4	ug/L	1	13	13.	2.9	7.4
4-Chloroaniline	U	7.4	ug/L	1	10	9.8	1.9	7.4
Hexachlorobutadiene	U	7.4	ug/L	1	10	9.8	1.8	7.4
4-Chloro-3-Methylphenol	U	7.4	ug/L	1	10	9.8	3.5	7.4
Hexachlorocyclopentadiene	U	7.4	ug/L	1	10	9.8	1.2	7.4
1,2,4,5-Tetrachlorobenzene	U	7.4	ug/L	1	10	9.8	1.8	7.4
2,4,6-Trichlorophenol	U	7.4	ug/L	1	10	9.8	2.6	7.4
2,4,5-Trichlorophenol	U	18.	ug/L	1	25	24.	3.5	18.
2-Nitroaniline	U	18.	ug/L	1	25	24.	1.8	18.
Dimethyl Phthalate	U	7.4	ug/L	1	10	9.8	2.0	7.4
2,6-Dinitrotoluene	U	7.4	ug/L	1	10	9.8	2.0	7.4
3-Nitroaniline	U	18.	ug/L	1	25	24.	1.5	18.
2,4-Dinitrophenol	U	18.	ug/L	1	45	44.	0.98	18.
Dibenzofuran	U	7.4	ug/L	1	10	9.8	1.6	7.4
4-Nitrophenol	U	18.	ug/L	1	25	24.	1.8	18.
2,4-Dinitrotoluene	U	7.4	ug/L	1	10	9.8	2.2	7.4
2,3,4,6-Tetrachlorophenol	U	7.4	ug/L	1	10	9.8	2.6	7.4
Diethylphthalate	U	7.4	ug/L	1	10	9.8	2.0	7.4
4-Chlorophenyl-Phenylether	U	7.4	ug/L	1	10	9.8	2.2	7.4
4-Nitroaniline	U	18.	ug/L	1	25	24.	1.6	18.
4,6-Dinitro-2-Methylphenol	U	18.	ug/L	1	25	24.	2.0	18.
N-Nitrosodiphenylamine/DPA	U	7.4	ug/L	1	10	9.8	3.6	7.4

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-7
Client ID: VEPQIR-EB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80994

Analysis Date: 18-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
4-Bromophenyl-Phenylether	U	7.4	ug/L	1	10	9.8	1.9	7.4
Butylbenzylphthalate	U	7.4	ug/L	1	10	9.8	1.9	7.4
3,3'-Dichlorobenzidine	U	7.4	ug/L	1	10	9.8	1.1	7.4
Di-N-Octylphthalate	U	7.4	ug/L	1	10	9.8	1.8	7.4
Benzaldehyde	U	7.4	ug/L	1	10	9.8	0.98	7.4
Caprolactam	U	7.4	ug/L	1	10	9.8	0.39	7.4
1,1'-Biphenyl	U	7.4	ug/L	1	10	9.8	2.6	7.4
Atrazine	U	7.4	ug/L	1	10	9.8	3.2	7.4
2-Fluorophenol		54.1	%					
Phenol-d6		73.8	%					
Nitrobenzene-d5		75.2	%					
2-Fluorobiphenyl		83.0	%					
2,4,6-Tribromophenol		81.3	%					
Terphenyl-d14		107.	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-3
Client ID: PQIR-SS02-0304-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 81.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	12.	ug/Kg	1	20	23.	3.0	12.
2-Methylnaphthalene	U	12.	ug/Kg	1	20	23.	8.5	12.
Acenaphthylene	U	12.	ug/Kg	1	20	23.	2.6	12.
Acenaphthene	U	12.	ug/Kg	1	20	23.	6.9	12.
Fluorene	U	12.	ug/Kg	1	20	23.	3.6	12.
Phenanthrene	U	12.	ug/Kg	1	20	23.	3.0	12.
Anthracene	U	12.	ug/Kg	1	20	23.	4.2	12.
Fluoranthene	J	5.2	ug/Kg	1	20	23.	4.1	12.
Pyrene	J	8.1	ug/Kg	1	20	23.	3.7	12.
Benzo (a) anthracene	J	4.3	ug/Kg	1	20	23.	3.5	12.
Chrysene	J	6.2	ug/Kg	1	20	23.	3.4	12.
Benzo (b) Fluoranthene	J	8.4	ug/Kg	1	20	23.	3.6	12.
Benzo(k)fluoranthene	J	3.8	ug/Kg	1	20	23.	3.5	12.
Benzo(a)pyrene	J	4.8	ug/Kg	1	20	23.	3.5	12.
Indeno (1,2,3-cd) pyrene	J	13.	ug/Kg	1	20	23.	5.3	12.
Dibenzo (a,h) anthracene	U	12.	ug/Kg	1	20	23.	4.4	12.
Benzo(g,h,i)perylene	U	12.	ug/Kg	1	20	23.	3.6	12.
1,4-Dioxane	U	58.	ug/Kg	1	170	200	1.3	58.
Hexachloroethane	U	12.	ug/Kg	1	100	120	2.3	12.
2-Chloronaphthalene	U	12.	ug/Kg	1	20	23.	4.2	12.
Hexachlorobenzene	U	12.	ug/Kg	1	100	120	2.1	12.
Pentachlorophenol	U	58.	ug/Kg	1	100	120	16.	58.
Carbazole	U	12.	ug/Kg	1	20	23.	1.5	12.
Di-n-butylphthalate	U	58.	ug/Kg	1	100	120	20.	58.
Bis(2-ethylhexyl)phthalate	~~JB~~ U	91.	ug/Kg	1	100	120	37.	58. NBL
2-Methylnaphthalene-D10		57.9	%					
Fluorene-D10		58.7	%					
Pyrene-D10		104.	%					
2,4-Dibromophenol		64.1	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-4
Client ID: PQIR-SB02-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	11.	ug/Kg	1	20	22.	2.9	11.
2-Methylnaphthalene	U	11.	ug/Kg	1	20	22.	8.1	11.
Acenaphthylene	U	11.	ug/Kg	1	20	22.	2.4	11.
Acenaphthene	U	11.	ug/Kg	1	20	22.	6.5	11.
Fluorene	U	11.	ug/Kg	1	20	22.	3.4	11.
Phenanthrene	U	11.	ug/Kg	1	20	22.	2.9	11.
Anthracene	U	11.	ug/Kg	1	20	22.	4.0	11.
Fluoranthene	U	11.	ug/Kg	1	20	22.	3.9	11.
Pyrene	U	11.	ug/Kg	1	20	22.	3.5	11.
Benzo (a) anthracene	U	11.	ug/Kg	1	20	22.	3.3	11.
Chrysene	U	11.	ug/Kg	1	20	22.	3.2	11.
Benzo (b) Fluoranthene	U	11.	ug/Kg	1	20	22.	3.4	11.
Benzo(k)fluoranthene	U	11.	ug/Kg	1	20	22.	3.3	11.
Benzo(a)pyrene	U	11.	ug/Kg	1	20	22.	3.3	11.
Indeno (1,2,3-cd) pyrene	U	11.	ug/Kg	1	20	22.	5.0	11.
Dibenzo (a,h) anthracene	U	11.	ug/Kg	1	20	22.	4.2	11.
Benzo(g,h,i)perylene	U	11.	ug/Kg	1	20	22.	3.4	11.
1,4-Dioxane	U	55.	ug/Kg	1	170	190	1.2	55.
Hexachloroethane	U	11.	ug/Kg	1	100	110	2.2	11.
2-Chloronaphthalene	U	11.	ug/Kg	1	20	22.	4.0	11.
Hexachlorobenzene	U	11.	ug/Kg	1	100	110	2.0	11.
Pentachlorophenol	U	55.	ug/Kg	1	100	110	16.	55.
Carbazole	U	11.	ug/Kg	1	20	22.	1.4	11.
Di-n-butylphthalate	U	55.	ug/Kg	1	100	110	19.	55.
Bis(2-ethylhexyl)phthalate	U	55.	ug/Kg	1	100	110	35.	55.
2-Methylnaphthalene-D10		45.1	%					
Fluorene-D10		53.0	%					
Pyrene-D10		83.7	%					
2,4-Dibromophenol		61.8	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5
Client ID: QIR-SB02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 82.
Report Date: 08-OCT-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	12.	ug/Kgdrywt	1	20	24.	3.1	12.
2-Methylnaphthalene	U	12.	ug/Kgdrywt	1	20	24.	8.7	12.
Acenaphthylene	U	12.	ug/Kgdrywt	1	20	24.	2.6	12.
Acenaphthene	U	12.	ug/Kgdrywt	1	20	24.	7.0	12.
Fluorene	U	12.	ug/Kgdrywt	1	20	24.	3.7	12.
Phenanthrene	J	4.4	ug/Kgdrywt	1	20	24.	3.1	12.
Anthracene	U	12.	ug/Kgdrywt	1	20	24.	4.3	12.
Fluoranthene	J	12.	ug/Kgdrywt	1	20	24.	4.2	12.
Pyrene	J	12.	ug/Kgdrywt	1	20	24.	3.8	12.
Benzo (a) anthracene	J	5.8	ug/Kgdrywt	1	20	24.	3.6	12.
Chrysene	J	8.7	ug/Kgdrywt	1	20	24.	3.4	12.
Benzo (b) Fluoranthene	J	12.	ug/Kgdrywt	1	20	24.	3.7	12.
Benzo(k)fluoranthene	J	5.6	ug/Kgdrywt	1	20	24.	3.6	12.
Benzo(a)pyrene	J	7.8	ug/Kgdrywt	1	20	24.	3.6	12.
Indeno (1,2,3-cd) pyrene	J	17.	ug/Kgdrywt	1	20	24.	5.4	12.
Dibenzo (a,h) anthracene	J	8.8	ug/Kgdrywt	1	20	24.	4.5	12.
Benzo(g,h,i)perylene	J	5.8	ug/Kgdrywt	1	20	24.	3.7	12.
1,4-Dioxane	U	60.	ug/Kgdrywt	1	170	200	1.3	60.
Hexachloroethane	U	12.	ug/Kgdrywt	1	100	120	2.4	12.
2-Chloronaphthalene	U	12.	ug/Kgdrywt	1	20	24.	4.3	12.
Hexachlorobenzene	U	12.	ug/Kgdrywt	1	100	120	2.1	12.
Pentachlorophenol	U	60.	ug/Kgdrywt	1	100	120	17.	60.
Carbazole	U	1.6	ug/Kgdrywt	1	20	24.	1.6	12.
Di-n-butylphthalate	U	60.	ug/Kgdrywt	1	100	120	20.	60.
Bis(2-ethylhexyl)phthalate	~~JB~~ U	~~59.~~ 60	ug/Kgdrywt	1	100	120	38.	60. MRL
2-Methylnaphthalene-D10		57.6	%					
Fluorene-D10		59.9	%					
Pyrene-D10		111.	%					
2,4-Dibromophenol		86.8	%					

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REISSUE

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-5 JB
Client ID: QIR-SS02P-0709-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 82.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	12.	ug/Kg	1	20	24.	3.1	12.
2-Methylnaphthalene	U	12.	ug/Kg	1	20	24.	8.7	12.
Acenaphthylene	U	12.	ug/Kg	1	20	24.	2.6	12.
Acenaphthene	U	12.	ug/Kg	1	20	24.	7.0	12.
Fluorene	U	12.	ug/Kg	1	20	24.	3.7	12.
Phenanthrene	J	4.4	ug/Kg	1	20	24.	3.1	12.
Anthracene	U	12.	ug/Kg	1	20	24.	4.3	12.
Fluoranthene	J	12.	ug/Kg	1	20	24.	4.2	12.
Pyrene	J	12.	ug/Kg	1	20	24.	3.8	12.
Benzo (a) anthracene	J	5.8	ug/Kg	1	20	24.	3.6	12.
Chrysene	J	8.7	ug/Kg	1	20	24.	3.4	12.
Benzo (b) Fluoranthene	J	12.	ug/Kg	1	20	24.	3.7	12.
Benzo(k)fluoranthene	J	5.6	ug/Kg	1	20	24.	3.6	12.
Benzo(a)pyrene	J	7.8	ug/Kg	1	20	24.	3.6	12.
Indeno (1,2,3-cd) pyrene	J	17.	ug/Kg	1	20	24.	5.4	12.
Dibenzo (a,h) anthracene	J	8.8	ug/Kg	1	20	24.	4.5	12.
Benzo(g,h,i)perylene	J	5.8	ug/Kg	1	20	24.	3.7	12.
1,4-Dioxane	U	60.	ug/Kg	1	170	200	1.3	60.
Hexachloroethane	U	12.	ug/Kg	1	100	120	2.4	12.
2-Chloronaphthalene	U	12.	ug/Kg	1	20	24.	4.3	12.
Hexachlorobenzene	U	12.	ug/Kg	1	100	120	2.1	12.
Pentachlorophenol	U	60.	ug/Kg	1	100	120	17.	60.
Carbazole	U	1.6	ug/Kg	1	20	24.	1.6	12.
Di-n-butylphthalate	U	60.	ug/Kg	1	100	120	20.	60.
Bis(2-ethylhexyl)phthalate	JB	59.	ug/Kg	1	100	120	38.	60.
2-Methylnaphthalene-D10		57.6	%					
Fluorene-D10		59.9	%					
Pyrene-D10		111.	%					
2,4-Dibromophenol		86.8	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 84.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	11.	ug/Kg	1	20	23.	3.0	11.
2-Methylnaphthalene	U	11.	ug/Kg	1	20	23.	8.4	11.
Acenaphthylene	U	11.	ug/Kg	1	20	23.	2.5	11.
Acenaphthene	U	11.	ug/Kg	1	20	23.	6.8	11.
Fluorene	U	11.	ug/Kg	1	20	23.	3.5	11.
Phenanthrene	U	11.	ug/Kg	1	20	23.	3.0	11.
Anthracene	U	11.	ug/Kg	1	20	23.	4.1	11.
Fluoranthene	U	11.	ug/Kg	1	20	23.	4.0	11.
Pyrene	U	11.	ug/Kg	1	20	23.	3.7	11.
Benzo (a) anthracene	U	11.	ug/Kg	1	20	23.	3.4	11.
Chrysene	U	11.	ug/Kg	1	20	23.	3.3	11.
Benzo (b) Fluoranthene	U	11.	ug/Kg	1	20	23.	3.5	11.
Benzo(k)fluoranthene	U	11.	ug/Kg	1	20	23.	3.4	11.
Benzo(a)pyrene	U	11.	ug/Kg	1	20	23.	3.4	11.
Indeno (1,2,3-cd) pyrene	J	11.	ug/Kg	1	20	23.	5.2	11.
Dibenzo (a,h) anthracene	J	7.7	ug/Kg	1	20	23.	4.3	11.
Benzo(g,h,i)perylene	U	11.	ug/Kg	1	20	23.	3.5	11.
1,4-Dioxane	U	57.	ug/Kg	1	170	190	1.2	57.
Hexachloroethane	U	11.	ug/Kg	1	100	110	2.3	11.
2-Chloronaphthalene	U	11.	ug/Kg	1	20	23.	4.1	11.
Hexachlorobenzene	U	11.	ug/Kg	1	100	110	2.1	11.
Pentachlorophenol	U	57.	ug/Kg	1	100	110	16.	57.
Carbazole	U	11.	ug/Kg	1	20	23.	1.5	11.
Di-n-butylphthalate	U	57.	ug/Kg	1	100	110	19.	57.
Bis(2-ethylhexyl)phthalate	~~JB~~ U	~~39.~~ 57	ug/Kg	1	100	110	37.	57. MEL
2-Methylnaphthalene-D10		55.3	%					
Fluorene-D10		60.2	%					
Pyrene-D10		93.8	%					
2,4-Dibromophenol		78.4	%					

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-9
Client ID: PQIR-SB01-0810-0810
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 86.
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD	
Naphthalene	U	11.	ug/Kg	1	20	21.	2.8	11.	
2-Methylnaphthalene	U	11.	ug/Kg	1	20	21.	7.8	11.	
Acenaphthylene	U	11.	ug/Kg	1	20	21.	2.3	11.	
Acenaphthene	U	11.	ug/Kg	1	20	21.	6.3	11.	
Fluorene	U	11.	ug/Kg	1	20	21.	3.3	11.	
Phenanthrene	U	11.	ug/Kg	1	20	21.	2.8	11.	
Anthracene	U	11.	ug/Kg	1	20	21.	3.8	11.	
Fluoranthene	U	11.	ug/Kg	1	20	21.	3.7	11.	
Pyrene	U	11.	ug/Kg	1	20	21.	3.4	11.	
Benzo (a) anthracene	U	11.	ug/Kg	1	20	21.	3.2	11.	
Chrysene	U	11.	ug/Kg	1	20	21.	3.1	11.	
Benzo (b) Fluoranthene	U	11.	ug/Kg	1	20	21.	3.3	11.	
Benzo(k)fluoranthene	U	11.	ug/Kg	1	20	21.	3.2	11.	
Benzo(a)pyrene	U	11.	ug/Kg	1	20	21.	3.2	11.	
Indeno (1,2,3-cd) pyrene	U	11.	ug/Kg	1	20	21.	4.8	11.	
Dibenzo (a,h) anthracene	U	11.	ug/Kg	1	20	21.	4.0	11.	
Benzo(g,h,i)perylene	U	11.	ug/Kg	1	20	21.	3.3	11.	
1,4-Dioxane	U	53.	ug/Kg	1	170	180	1.2	53.	
Hexachloroethane	U	11.	ug/Kg	1	100	110	2.1	11.	
2-Chloronaphthalene	U	11.	ug/Kg	1	20	21.	3.8	11.	
Hexachlorobenzene	U	11.	ug/Kg	1	100	110	1.9	11.	
Pentachlorophenol	U	53.	ug/Kg	1	100	110	15.	53.	
Carbazole	U	11.	ug/Kg	1	20	21.	1.4	11.	
Di-n-butylphthalate	U	53.	ug/Kg	1	100	110	18.	53.	
Bis(2-ethylhexyl)phthalate	~~JB~~ U	91.	ug/Kg	1	100	110	34.	53.	MBL
2-Methylnaphthalene-D10		52.5	%						
Fluorene-D10		55.2	%						
Pyrene-D10		86.5	%						
2,4-Dibromophenol		93.7	%						

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-2
Client ID: VEPQIR-EB01-081010
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 10-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80995

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
2-Methylnaphthalene	U	0.098	ug/L	1	.2	0.20	0.075	0.098
Acenaphthylene	U	0.098	ug/L	1	.2	0.20	0.053	0.098
Acenaphthene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
Fluorene	U	0.098	ug/L	1	.2	0.20	0.060	0.098
Phenanthrene	U	0.098	ug/L	1	.2	0.20	0.050	0.098
Anthracene	U	0.098	ug/L	1	.2	0.20	0.043	0.098
Fluoranthene	U	0.098	ug/L	1	.22	0.22	0.072	0.098
Pyrene	U	0.098	ug/L	1	.2	0.20	0.058	0.098
Benzo (a) anthracene	U	0.098	ug/L	1	.2	0.20	0.045	0.098
Chrysene	U	0.098	ug/L	1	.2	0.20	0.035	0.098
Benzo (b) Fluoranthene	U	0.098	ug/L	1	.27	0.26	0.087	0.098
Benzo(k)fluoranthene	U	0.098	ug/L	1	.2	0.20	0.048	0.098
Benzo(a)pyrene	U	0.098	ug/L	1	.2	0.20	0.065	0.098
Indeno (1,2,3-cd) pyrene	U	0.098	ug/L	1	.2	0.20	0.051	0.098
Dibenzo (a,h) anthracene	U	0.098	ug/L	1	.21	0.20	0.069	0.098
Benzo(g,h,i)perylene	U	0.098	ug/L	1	.2	0.20	0.064	0.098
Hexachloroethane	U	0.098	ug/L	1	.22	0.22	0.072	0.098
2-Chloronaphthalene	U	0.098	ug/L	1	.2	0.20	0.070	0.098
Hexachlorobenzene	U	0.098	ug/L	1	.2	0.20	0.054	0.098
Pentachlorophenol	U	0.49	ug/L	1	1	0.98	0.32	0.49
Carbazole	U	0.29	ug/L	1	.57	0.56	0.19	0.29
Di-n-butylphthalate	U	1.2	ug/L	1	2.5	2.4	0.81	1.2
Bis(2-ethylhexyl)phthalate	~~B~~	5.0	ug/L	1	2	2.0	0.49	0.98
1,4-Dioxane	U	0.49	ug/L	1	1	0.98	0.028	0.49
2-Methylnaphthalene-D10		76.0	%					
Fluorene-D10		67.3	%					
pyrene-d10		104.	%					
2,4-Dibromophenol		35.0	%					

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Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD4910-7
Client ID: VEPQIR-EB01-081110
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Date: 11-AUG-10
Received Date: 12-AUG-10
Extract Date: 16-AUG-10
Extracted By: WS
Extraction Method: SW846 3520
Lab Prep Batch: WG80995

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: AQ
% Solids: NA
Report Date: 04-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
2-Methylnaphthalene	U	0.098	ug/L	1	.2	0.20	0.075	0.098
Acenaphthylene	U	0.098	ug/L	1	.2	0.20	0.053	0.098
Acenaphthene	U	0.098	ug/L	1	.2	0.20	0.063	0.098
Fluorene	U	0.098	ug/L	1	.2	0.20	0.060	0.098
Phenanthrene	U	0.098	ug/L	1	.2	0.20	0.050	0.098
Anthracene	U	0.098	ug/L	1	.2	0.20	0.043	0.098
Fluoranthene	U	0.098	ug/L	1	.22	0.22	0.072	0.098
Pyrene	U	0.098	ug/L	1	.2	0.20	0.058	0.098
Benzo (a) anthracene	U	0.098	ug/L	1	.2	0.20	0.045	0.098
Chrysene	U	0.098	ug/L	1	.2	0.20	0.035	0.098
Benzo (b) Fluoranthene	U	0.098	ug/L	1	.27	0.26	0.087	0.098
Benzo(k)fluoranthene	U	0.098	ug/L	1	.2	0.20	0.048	0.098
Benzo(a)pyrene	U	0.098	ug/L	1	.2	0.20	0.065	0.098
Indeno (1,2,3-cd) pyrene	U	0.098	ug/L	1	.2	0.20	0.051	0.098
Dibenzo (a,h) anthracene	U	0.098	ug/L	1	.21	0.20	0.069	0.098
Benzo(g,h,i)perylene	U	0.098	ug/L	1	.2	0.20	0.064	0.098
Hexachloroethane	U	0.098	ug/L	1	.22	0.22	0.072	0.098
2-Chloronaphthalene	U	0.098	ug/L	1	.2	0.20	0.070	0.098
Hexachlorobenzene	U	0.098	ug/L	1	.2	0.20	0.054	0.098
Pentachlorophenol	U	0.49	ug/L	1	1	0.98	0.32	0.49
Carbazole	U	0.29	ug/L	1	.57	0.56	0.19	0.29
Di-n-butylphthalate	U	1.2	ug/L	1	2.5	2.4	0.81	1.2
Bis(2-ethylhexyl)phthalate	~~B~~	3.7	ug/L	1	2	2.0	0.49	0.98
1,4-Dioxane	U	0.49	ug/L	1	1	0.98	0.028	0.49
2-Methylnaphthalene-D10		71.6	%					
Fluorene-D10		58.5	%					
pyrene-d10		95.7	%					
2,4-Dibromophenol		70.1	%					

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Project: CTO-111 Vieques, Vieques Island, Puerto Rico
Laboratory: Katahdin Analytical Services
Sample Delivery Group: SD5038
Fraction: Organic
Matrix: Soil
Report Date: 10/31/2010

This analytical quality assurance report is based upon a review of analytical data generated for soil samples. One equipment blank and one field duplicate sample were submitted with the samples for this Sample Delivery Group. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

The samples were analyzed for semivolatile organic compounds. The sample analyses were performed in accordance with the procedures outlined in the methods referenced at the end of this report.

All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to Region II guidance:

- "USEPA Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry", SW-846 Method 8270D, SOP HW-22, Revision 4, August 2008

The following parameters were evaluated.

X	•	Data Completeness
X	•	Chain of Custody Documentation
X	•	Holding Times
X	•	Instrument Performance
X	•	Initial and Continuing Calibrations
X	•	Laboratory and Field Blank Analysis Results
X	•	Surrogate Compound Recoveries
X	•	Matrix Spike/Matrix Spike Duplicate Recoveries and Reproducibility
X	•	Field Duplicate Analysis Results
X	•	Laboratory Control Sample Results
X	•	Internal Standard Performance
X	•	Qualitative Identification
X	•	Quantitation/Reporting Limits

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:

Shawne M. Rodgers
President

11/3/01

Date

1.0 *DATA COMPLETENESS*

The data package was complete.

2.0 *CHAIN OF CUSTODY DOCUMENTATION*

The chain of custody documentation was complete.

3.0 *HOLDING TIMES*

All criteria were met. No qualifiers were applied.

4.0 *INSTRUMENT PERFORMANCE*

All criteria were met. No qualifiers were applied.

5.0 *INITIAL AND CONTINUING CALIBRATIONS*

The positive result reported for bis(2-ethylhexyl)phthalate for PI07-EB01-081610 should be considered a quantitative estimate. The continuing calibration precision criterion was exceeded for this compound. This indicates a lack of instrument stability for this compound. The positive result has been marked "J" to indicate that it is a quantitative estimate.

6.0 *LABORATORY AND FIELD BLANK ANALYSIS RESULTS*

The semivolatile compounds presented in the following table were detected in associated laboratory method blanks and equipment blanks.

Blank	Compound	Concentration (µg/Kg)	Associated Samples
WG81151	Bis(2-Ethylhexyl)phthalate	66	All samples
PI07-EB01-081610	Bis(2-Ethylhexyl)phthalate	97	All samples

The positive results reported for bis(2-ethylhexyl)phthalate for all samples are qualitatively invalid due to the presence of this compound in associated the equipment blank. These sample results are all less than their respective quantitation limits. USEPA Region II protocol requires positive sample results for contaminants that are less than the quantitation limit, to be considered qualitatively invalid. Replacing results that are less than the quantitation limit with the Limit of Detection (LOD) and marked "U" has indicated this. Results that are greater than the LOD but less than the quantitation limit have been marked "U".

7.0 SURROGATE COMPOUND RECOVERIES

All criteria were met. No qualifiers were applied.

8.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY

All criteria were met. No qualifiers were applied.

9.0 FIELD DUPLICATE RESULTS

Duplicate samples, PI07-SB42-0101H-0810 and PI07-SB42P-0101H-0810, were submitted to the laboratory evaluate sampling and analytical precision for those analytes determined to be present. There were no positive results reported for these samples. Precision is evaluated by calculating the relative percent difference (%RPD) between duplicate pair results. There are no USEPA-established acceptance criteria for field duplicate samples. EDQ uses internal acceptance criteria of thirty percent

for volatile detected compounds (and forty percent for extractable compounds) to evaluate solid field duplicate samples.

10.0 LABORATORY CONTROL SAMPLE RESULTS

All criteria were met. No qualifiers were applied.

11.0 INTERNAL STANDARD PERFORMANCE

All criteria were met. No qualifiers were applied.

12.0 QUALITATIVE IDENTIFICATION

All criteria were met. No qualifiers were applied.

13.0 QUANTITATION/REPORTING LIMITS

As required by USEPA protocol, all compounds, which were qualitatively identified at concentrations below their respective Limits of Quantitation (LOQs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

METHODOLOGY REFERENCES

Analysis	Reference
Semivolatile Organic Compounds	Method 8270C, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997

Table 1 Samples For Data Validation Review
Vieques NTR, CTO-111
Vieques Island, Puerto Rico
Katahdin Analytical Services Sample Delivery Group SD5038

SAMPLE I.D.	LABORATORY I.D	DATE COLLECTED	MATRIX	ANALYSES PERFORMED SVOC
PI07-EB01-081610	SD5038-01	8/16/2010	Equipment Blank	X
PI07-SS42-0001-0810	SD5038-02	8/17/2010	Soil	X
PI07-SB42-0101H-0810	SD5038-03	8/17/2010	Soil	X
PI07-SB42P-0101H-0810	SD5038-04	8/17/2010	Soil	X

SVOC SEMIVOLATILE ORGANIC COMPOUNDS (SIM only)

Table 2 **Field Duplicate Sample Results for Organic Results**
Soil Duplicate Samples PI07-SB42-0101H-0810 and PI07-SB42P-0101H-0810

Compound	Sample Results (µg/Kg)		Field Duplicate Results (µg/Kg)		RPD	FOOT NOTES
	PI07-SB42-0101H-0810		PI07-SB42P-0101H-0810			
bis(2-Ethylhexyl)phthalate	75	U	53	U	NC	

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD5038-1
Client ID: PI07-EB01-081610
Project: CTO-111 NTR Vieques
SDG: SD5038

Sample Date: 16-AUG-10
Received Date: 18-AUG-10
Extract Date: 23-AUG-10
Extracted By: KF
Extraction Method: SW846 3510
Lab Prep Batch: WG81271

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: AQ
% Solids: NA
Report Date: 10-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	0.10	ug/L	1	.2	0.21	0.067	0.10
2-Methylnaphthalene	U	0.10	ug/L	1	.2	0.21	0.081	0.10
Acenaphthylene	U	0.10	ug/L	1	.2	0.21	0.057	0.10
Acenaphthene	U	0.10	ug/L	1	.2	0.21	0.067	0.10
Fluorene	U	0.10	ug/L	1	.2	0.21	0.064	0.10
Phenanthrene	U	0.10	ug/L	1	.2	0.21	0.054	0.10
Anthracene	U	0.10	ug/L	1	.2	0.21	0.046	0.10
Fluoranthene	U	0.10	ug/L	1	.22	0.23	0.077	0.10
Pyrene	U	0.10	ug/L	1	.2	0.21	0.062	0.10
Benzo (a) anthracene	U	0.10	ug/L	1	.2	0.21	0.048	0.10
Chrysene	U	0.10	ug/L	1	.2	0.21	0.038	0.10
Benzo (b) Fluoranthene	U	0.10	ug/L	1	.27	0.28	0.094	0.10
Benzo(k)fluoranthene	U	0.10	ug/L	1	.2	0.21	0.052	0.10
Benzo(a)pyrene	U	0.10	ug/L	1	.2	0.21	0.069	0.10
Indeno (1,2,3-cd) pyrene	U	0.10	ug/L	1	.2	0.21	0.055	0.10
Dibenzo (a,h) anthracene	U	0.10	ug/L	1	.21	0.22	0.074	0.10
Benzo(g,h,i)perylene	U	0.10	ug/L	1	.2	0.21	0.068	0.10
Hexachloroethane	U	0.10	ug/L	1	.22	0.23	0.077	0.10
2-Chloronaphthalene	U	0.10	ug/L	1	.2	0.21	0.076	0.10
Hexachlorobenzene	U	0.10	ug/L	1	.2	0.21	0.058	0.10
Pentachlorophenol	U	0.53	ug/L	1	1	1.0	0.35	0.53
Carbazole	U	0.32	ug/L	1	.57	0.60	0.20	0.32
Di-n-butylphthalate	U	1.3	ug/L	1	2.5	2.6	0.87	1.3
Bis(2-ethylhexyl)phthalate	J	2.9	ug/L	1	2	2.1	0.53	1.0 CCH
1,4-Dioxane	U	0.53	ug/L	1	1	1.0	0.030	0.53
2-Methylnaphthalene-D10		64.3	%					
Fluorene-D10		50.5	%					
pyrene-d10		118.	%					
2,4-Dibromophenol		64.8	%					

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Report of Analytical Results

Client: CH2MHill
Lab ID: SD5038-2
Client ID: PI07-SS42-0001-0810
Project: CTO-111 NTR Vieques
SDG: SD5038

Sample Date: 17-AUG-10
Received Date: 18-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 81.
Report Date: 13-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	12.	ug/Kgdrywt	1	20	23.	3.0	12.
2-Methylnaphthalene	U	12.	ug/Kgdrywt	1	20	23.	8.5	12.
Acenaphthylene	U	12.	ug/Kgdrywt	1	20	23.	2.6	12.
Acenaphthene	U	12.	ug/Kgdrywt	1	20	23.	6.8	12.
Fluorene	U	12.	ug/Kgdrywt	1	20	23.	3.6	12.
Phenanthrene	U	12.	ug/Kgdrywt	1	20	23.	3.0	12.
Anthracene	U	12.	ug/Kgdrywt	1	20	23.	4.2	12.
Fluoranthene	U	12.	ug/Kgdrywt	1	20	23.	4.0	12.
Pyrene	U	12.	ug/Kgdrywt	1	20	23.	3.7	12.
Benzo (a) anthracene	U	12.	ug/Kgdrywt	1	20	23.	3.5	12.
Chrysene	U	12.	ug/Kgdrywt	1	20	23.	3.4	12.
Benzo (b) Fluoranthene	U	12.	ug/Kgdrywt	1	20	23.	3.6	12.
Benzo(k)fluoranthene	U	12.	ug/Kgdrywt	1	20	23.	3.5	12.
Benzo(a)pyrene	U	12.	ug/Kgdrywt	1	20	23.	3.5	12.
Indeno (1,2,3-cd) pyrene	U	12.	ug/Kgdrywt	1	20	23.	5.2	12.
Dibenzo (a,h) anthracene	U	12.	ug/Kgdrywt	1	20	23.	4.4	12.
Benzo(g,h,i)perylene	U	12.	ug/Kgdrywt	1	20	23.	3.6	12.
1,4-Dioxane	U	58.	ug/Kgdrywt	1	170	200	1.3	58.
Hexachloroethane	U	12.	ug/Kgdrywt	1	100	120	2.3	12.
2-Chloronaphthalene	U	12.	ug/Kgdrywt	1	20	23.	4.2	12.
Hexachlorobenzene	U	12.	ug/Kgdrywt	1	100	120	2.1	12.
Pentachlorophenol	U	58.	ug/Kgdrywt	1	100	120	16.	58.
Carbazole	U	12.	ug/Kgdrywt	1	20	23.	1.5	12.
Di-n-butylphthalate	U	58.	ug/Kgdrywt	1	100	120	19.	58.
Bis(2-ethylhexyl)phthalate	~~JB~~ U	~~47.~~ 58	ug/Kgdrywt	1	100	120	37.	58. EBL
2-Methylnaphthalene-D10		60.2	%					
Fluorene-D10		51.4	%					
Pyrene-D10		87.3	%					
2,4-Dibromophenol		85.2	%					

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Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD5038-3
Client ID: I07-SB42-0101H-0810
Project: CTO-111 NTR Vieques
SDG: SD5038

Sample Date: 17-AUG-10
Received Date: 18-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 95.
Report Date: 13-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	10.	ug/Kgdrywt	1	20	20.	2.6	10.
2-Methylnaphthalene	U	10.	ug/Kgdrywt	1	20	20.	7.4	10.
Acenaphthylene	U	10.	ug/Kgdrywt	1	20	20.	2.2	10.
Acenaphthene	U	10.	ug/Kgdrywt	1	20	20.	6.0	10.
Fluorene	U	10.	ug/Kgdrywt	1	20	20.	3.2	10.
Phenanthrene	U	10.	ug/Kgdrywt	1	20	20.	2.6	10.
Anthracene	U	10.	ug/Kgdrywt	1	20	20.	3.7	10.
Fluoranthene	U	10.	ug/Kgdrywt	1	20	20.	3.6	10.
Pyrene	U	10.	ug/Kgdrywt	1	20	20.	3.3	10.
Benzo (a) anthracene	U	10.	ug/Kgdrywt	1	20	20.	3.0	10.
Chrysene	U	10.	ug/Kgdrywt	1	20	20.	3.0	10.
Benzo (b) Fluoranthene	U	10.	ug/Kgdrywt	1	20	20.	3.2	10.
Benzo(k)fluoranthene	U	10.	ug/Kgdrywt	1	20	20.	3.0	10.
Benzo(a)pyrene	U	10.	ug/Kgdrywt	1	20	20.	3.0	10.
Indeno (1,2,3-cd) pyrene	U	10.	ug/Kgdrywt	1	20	20.	4.6	10.
Dibenzo (a,h) anthracene	U	10.	ug/Kgdrywt	1	20	20.	3.9	10.
Benzo(g,h,i)perylene	U	10.	ug/Kgdrywt	1	20	20.	3.2	10.
1,4-Dioxane	U	51.	ug/Kgdrywt	1	170	170	1.1	51.
Hexachloroethane	U	10.	ug/Kgdrywt	1	100	100	2.0	10.
2-Chloronaphthalene	U	10.	ug/Kgdrywt	1	20	20.	3.7	10.
Hexachlorobenzene	U	10.	ug/Kgdrywt	1	100	100	1.8	10.
Pentachlorophenol	U	51.	ug/Kgdrywt	1	100	100	14.	51.
Carbazole	U	10.	ug/Kgdrywt	1	20	20.	1.3	10.
Di-n-butylphthalate	U	51.	ug/Kgdrywt	1	100	100	17.	51.
Bis(2-ethylhexyl)phthalate	~~JB~~ U	75.	ug/Kgdrywt	1	100	100	33.	51. EBL
2-Methylnaphthalene-D10		61.7	%					
Fluorene-D10		51.2	%					
Pyrene-D10		90.9	%					
2,4-Dibromophenol		68.4	%					

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Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: CH2MHill
Lab ID: SD5038-4
Client ID: 07-SB42P-0101H-0810
Project: CTO-111 NTR Vieques
SDG: SD5038

Sample Date: 17-AUG-10
Received Date: 18-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 94.
Report Date: 13-SEP-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	U	10.	ug/Kgdrywt	1	20	21.	2.7	10.
2-Methylnaphthalene	U	10.	ug/Kgdrywt	1	20	21.	7.6	10.
Acenaphthylene	U	10.	ug/Kgdrywt	1	20	21.	2.3	10.
Acenaphthene	U	10.	ug/Kgdrywt	1	20	21.	6.2	10.
Fluorene	U	10.	ug/Kgdrywt	1	20	21.	3.2	10.
Phenanthrene	U	10.	ug/Kgdrywt	1	20	21.	2.7	10.
Anthracene	U	10.	ug/Kgdrywt	1	20	21.	3.8	10.
Fluoranthene	U	10.	ug/Kgdrywt	1	20	21.	3.7	10.
Pyrene	U	10.	ug/Kgdrywt	1	20	21.	3.4	10.
Benzo (a) anthracene	U	10.	ug/Kgdrywt	1	20	21.	3.1	10.
Chrysene	U	10.	ug/Kgdrywt	1	20	21.	3.0	10.
Benzo (b) Fluoranthene	U	10.	ug/Kgdrywt	1	20	21.	3.2	10.
Benzo(k)fluoranthene	U	10.	ug/Kgdrywt	1	20	21.	3.1	10.
Benzo(a)pyrene	U	10.	ug/Kgdrywt	1	20	21.	3.1	10.
Indeno (1,2,3-cd) pyrene	U	10.	ug/Kgdrywt	1	20	21.	4.7	10.
Dibenzo (a,h) anthracene	U	10.	ug/Kgdrywt	1	20	21.	4.0	10.
Benzo(g,h,i)perylene	U	10.	ug/Kgdrywt	1	20	21.	3.2	10.
1,4-Dioxane	U	52.	ug/Kgdrywt	1	170	180	1.2	52.
Hexachloroethane	U	10.	ug/Kgdrywt	1	100	100	2.1	10.
2-Chloronaphthalene	U	10.	ug/Kgdrywt	1	20	21.	3.8	10.
Hexachlorobenzene	U	10.	ug/Kgdrywt	1	100	100	1.9	10.
Pentachlorophenol	U	52.	ug/Kgdrywt	1	100	100	15.	52.
Carbazole	U	10.	ug/Kgdrywt	1	20	21.	1.4	10.
Di-n-butylphthalate	U	52.	ug/Kgdrywt	1	100	100	18.	52.
Bis(2-ethylhexyl)phthalate ✓	~~JB~~ U	53.	ug/Kgdrywt	1	100	100	34.	52. EBL
2-Methylnaphthalene-D10		56.4	%					
Fluorene-D10		47.5	%					
Pyrene-D10		76.0	%					
2,4-Dibromophenol		66.6	%					

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Project: CTO-111 Vieques, Vieques Island, Puerto Rico
Laboratory: Katahdin Analytical Services
Sample Delivery Group: SD4910
Fraction: Inorganic
Matrix: Soil
Report Date: 11/3/2010

This analytical quality assurance report is based upon a review of analytical data generated for soil samples. Two equipment blanks, one field duplicate sample, and one matrix spike/matrix spike duplicate sample were submitted with the samples for this Sample Delivery Group. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

The samples were analyzed for metals and cyanide. The sample analyses were performed in accordance with the procedures outlined in the method referenced at the end of this report.

All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to general guidance provided in "Evaluation of Metals Data for the CLP Program", SOP HW-2, Revision 13, September 2006. The parameters presented on the following page were evaluated.

X	•	Data Completeness
X	•	Chain of Custody Documentation
X	•	Holding Times
X	•	Initial and Continuing Calibrations
X	•	ICP Interference Check Sample Results
X	•	Laboratory and Field Blank Analysis Results
X	•	Matrix Spike Recoveries and Reproducibility
X	•	Laboratory Duplicate Analysis Results
X	•	ICP Serial Dilution Results
X	•	Field Duplicate Analysis Results
X	•	Laboratory Control Sample Results
	•	GFAA Post-Digestion Spike Recovery/Duplicate Burn Precision
X	•	Qualitative Identification
X	•	Quantitation/Reporting Limits

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:

Shawne M. Rodgers
President

11/3/2010

Date

1.0 *DATA COMPLETENESS*

The data package was missing the Detection Limit summary form (Form 10) presenting soil Limits of Quantitation (LOQs). The laboratory was contacted and provided the missing form.

The data package was missing the 6020 tune report for the analyses on 8/27/2010. The laboratory was contacted and provided the missing data.

2.0 *CHAIN OF CUSTODY DOCUMENTATION*

All chain of custody documentation was complete.

3.0 *HOLDING TIMES*

All criteria were met. No qualifiers were applied.

4.0 *INITIAL AND CONTINUING CALIBRATIONS*

All criteria were met. No qualifiers were applied.

5.0 *ICP INTERFERENCE CHECK SAMPLE RESULTS*

The positive results reported for the analytes presented in the following table should be considered quantitative estimates due to possible interference as determined by interference check sample (ICS) results. These non-spiked analytes were found in the ICSA solution at concentrations greater than the CRQL. The affected results for these samples have been marked "J" to indicate that they are quantitative estimates.

Analyte	Affected Samples
Barium	All Samples
Chromium	All Samples
Copper	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810, VEPQIR-SB01-0810-0810, VEPQIR-EB01-081010
Manganese	VEPQIR-EB01-081010, VEPQIR-EB01-081110
Nickel	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810, VEPQIR-SB01-0810-0810

6.0 *LABORATORY AND FIELD BLANK ANALYSIS RESULTS*

The following positive results reported for selenium and anitimony are considered to be nondetect due to the presence of these analytes in the associated continuing calibration blanks and/or preparation blanks presented in Table 2. The analytes were detected in the associated continuing calibration blanks and/or preparation blanks at levels less than the quantitation limit, indicating the possibility of a false positive at this level. The affected results for these samples are less than the quantitation limit. Replacing results that are less than the LOQ with the Limit of Detection (LOD) and marked "U" has indicated this. Results that are greater than the LOD but less than the LOQ have been marked "U".

Analyte	Affected Samples
Selenium	VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810
Antimony	VEPQIR-SB01-0810-0810

7.0 *MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY*

The positive results reported for potassium for samples VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810, and VEPQIR-SB01-0810-0810 should be considered biased high quantitative estimates, and may be lower than reported. A high recovery for this analyte was obtained for the associated matrix spike analysis. The high recovery indicates the presence of interferences in samples of similar matrix. The positive results for potassium for these samples have been marked "J" to indicate that they are biased high quantitative estimates.

The positive results reported for antimony for samples VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, and VEPQIR-SS01-0405-0810 should be considered biased low quantitative estimates, and may be higher than reported. A low recovery for this analyte was obtained for the associated matrix spike analysis. The low recovery indicates the presence of interferences in samples of similar matrix. The positive results for antimony for these samples have been marked "J" to indicate that they are biased low quantitative estimates.

8.0 *LABORATORY DUPLICATE RESULTS*

The positive results reported for aluminum, calcium, and magnesium for samples VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810, and VEPQIR-SB01-0810-0810 should be considered quantitative estimates. The laboratory duplicate precision criterion of 35 percent for values greater than five times the CRDL (or ± two times the CRDL for results less than five times the CRDL) was exceeded for these analytes. The lack of precision may be due to heterogeneity of samples of similar matrix. These results have been marked "J" to indicate that they are quantitative estimates.

9.0 *ICP SERIAL DILUTION RESULTS*

The positive results reported for sodium for samples VEPQIR-SS02-0304-0810, VEPQIR-SB02-0709-0810, VEPQIR-SB02P-0709-0810, VEPQIR-SS01-0405-0810, and VEPQIR-SB01-0810-0810 should be considered quantitative estimates. The ICP serial dilution criterion was exceeded for this analyte. The lack of precision may be due to interferences in samples of similar matrix. The affected positive results for sodium have been marked "J" to indicate that they are quantitative estimates.

10.0 *FIELD DUPLICATE RESULTS*

Duplicate samples, VEPQIR-SB02-0709-0810 and VEPQIR-SB02P-0709-0810, were submitted to the laboratory to evaluate sampling and analytical precision for those analytes determined to be present. Results for these duplicate samples are presented in Table 3. The Region II criteria were met for the field duplicate samples, with the exception of barium and manganese. However, the results for these analytes had been previously qualified for the ICS results and no further qualification was necessary.

11.0 *LABORATORY CONTROL SAMPLE RESULTS*

All criteria were met. No qualifiers were applied.

12.0 *GFAA POST-DIGESTION SPIKE/DUPLICATE BURN*

This parameter is not applicable to the analyses performed.

13.0 *QUALITATIVE IDENTIFICATION*

All criteria were met. No qualifiers were applied.

14.0 *QUANTITATION/REPORTING LIMITS*

As required by USEPA protocol, all analytes, which were qualitatively identified at concentrations below their respective Limits of Quantitation (LOQs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

METHODOLOGY REFERENCES

Analysis	Reference
Metals	Method 6020, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997
Mercury	Method 7470/7471, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997
Cyanide	Method 9012, "Test Methods for Evaluating Solid Wastes", SW-846, third edition, Promulgated Updates II, IIA, and III, June 1997

Table 1 Samples For Data Validation Review
Vieques NTR, CTO-111
Vieques Island, Puerto Rico
Katahdin Analytical Services Sample Delivery Group SD4910

SAMPLE I.D.	LABORATORY I.D	DATE COLLECTED	MATRIX	ANALYSES PERFORMED		
				VOC	SVOC	METAL
VEPQIR-TB01-081010	SD4910-01	8/10/2010	Trip Blank	X		
VEPQIR-EB01-081010	SD4910-02	8/10/2010	Equipment Blank	X	X	X
VEPQIR-SS02-0304-0810	SD4910-03	8/10/2010	Soil	X	X	X
VEPQIR-SB02-0709-0810	SD4910-04	8/10/2010	Soil	X	X	X
VEPQIR-SB02P-0709-0810	SD4910-05	8/10/2010	Soil	X	X	X
VEPQIR-TB01-081110	SD4910-06	8/11/2010	Trip Blank	X		
VEPQIR-EB01-081110	SD4910-07	8/11/2010	Equipment Blank	X	X	X
VEPQIR-SS01-0405-0810	SD4910-08	8/11/2010	Soil	X	X	X
VEPQIR-SB01-0810-0810	SD4910-09	8/11/2010	Soil	X	X	X

VOC VOLATILE ORGANIC COMPOUNDS
SVOC SEMIVOLATILE ORGANIC COMPOUNDS (INCLUDING SIM ANALYSES)
METAL METALS, MERCURY, AND CYANIDE

Table 2 Blank Results for Inorganic Analyses

BLANK	ANALYTE	CONCENTRATION /UNITS		ASSOC. SAMPLES
PB1	Aluminum	1.949 J	mg/Kg	All Samples
	Barium	0.032 J	mg/Kg	
	Calcium	5.060 J	mg/Kg	
	Chromium	0.083 J	mg/Kg	
	Copper	0.051 J	mg/Kg	
	Magnesium	3.452 J	mg/Kg	
	Manganese	0.081 J	mg/Kg	
	Selenium	0.111 J	mg/Kg	
	Sodium	3.425 J	mg/Kg	
	Vanadium	0.082 J	mg/Kg	
	Zinc	0.147 J	mg/Kg	
CCB4	Antimony	0.0115 J	µg/L	VEPQIR-SB01-0810-0810
JAH25A				
CCB5	Antimony	0.0118 J	µg/L	VEPQIR-SB01-0810-0810
JAH25A				
CCB4	Calcium	5.69 J	µg/L	VEPQIR-SS02-0304-0810 (Mn), VEPQIR-SB02-0709-0810 (Mn), VEPQIR-SB02P-0304-0810 (Mn),
JAH27A	Iron	8.12 J	µg/L	VEPQIR-SS01-0405-0810 (Ca,Mn, Fe)
	Manganese	0.09 J	µg/L	
	Potassium	23.78 J	µg/L	
CCB1	Aluminum	1.95 J	µg/L	VEPQIR-SB01-0810-0810 (Al)
JAH30A				
CCB1	Magnesium	3.15 J	µg/L	VEPQIR-SS01-0405-0810 (Mg)
JAI01E				

Table 3 **Field Duplicate Sample Results for Total Inorganic Results**
Soil Duplicate Samples VEPQIR-SB02-0709-0810 and VEPQIR-SB02P-0709-0810

Analyte	Sample Results (µg/L)		Field Duplicate Results (µg/L)		RPD	FOOT NOTES
	VEPQIR-SB02-0709-0810		VEPQIR-SB02P-0709-0810			
Aluminum	39400	J	39200	J	1	1
Antimony	0.08	J	0.09	J	12	2
Arsenic	.64		0.53		19	2
Barium	224	J	121	J	60	1 *
Beryllium	0.34		0.4		16	2
Cadmium	0.08		0.05	J	46	2
Calcium	5370	J	6020	J	11	1
Chromium	27	J	26	J	4	1
Cobalt	18.4		21.4		15	1
Copper	85.4	J	77.2	J	10	1
Iron	39700		39200		1	1
Lead	2		2		0	1
Magnesium	4490	J	4340	J	3	1
Manganese	2360	J	1100	J	73	1 *
Mercury	0.01	J	0.01	J	0	2
Nickel	16.6	J	13.2	J	23	1
Potassium	1450	J	1480	J	2	1
Silver	ND		0.02	J	NC	2
Sodium	329	J	350	J	6	2
Thalllium	0.05	J	0.04	J	22	2
Vanadium	128		116		10	1
Zinc	33.5		29		14	1

1 Results > 5xLOQ; RPD <35%
2 Results < 5xLOQ; absolute difference <2xLOQ
* Precision criteria exceeded; however, previously qualified for ICS
NC Results not calculated due to one result was not detected (ND).
ND Not detected.

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: PQIR-SS02-0304-0810
Matrix: SOIL
SDG Name: SD4910
Percent Solids: 80.6
Lab Sample ID: SD4910-003

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD	
7429-90-5	ALUMINUM, TOTAL	20800	J	*	MS	25	130	1.91	18	LD
7440-36-0	ANTIMONY, TOTAL	0.23	J	N*	MS	5	0.088	0.01	0.044	MSL
7440-38-2	ARSENIC, TOTAL	1.1			MS	5	0.44	0.10	0.35	
7440-39-3	BARIUM, TOTAL	69.5	J		MS	5	0.18	0.02	0.18	OT
7440-41-7	BERYLLIUM, TOTAL	0.24			MS	5	0.088	0.01	0.018	
7440-43-9	CADMIUM, TOTAL	0.12			MS	5	0.088	0.01	0.018	
7440-70-2	CALCIUM, TOTAL	20600	J	*	MS	5	8.8	2.19	7.0	LD
7440-47-3	CHROMIUM, TOTAL	13.8	J	N*	MS	5	0.26	0.05	0.18	OT
7440-48-4	COBALT, TOTAL	11.7			MS	5	0.088	0.01	0.026	
7440-50-8	COPPER, TOTAL	56.8	J	N	MS	5	0.18	0.04	0.13	OT
7439-89-6	IRON, TOTAL	27500			MS	5	8.8	1.50	7.0	
7439-92-1	LEAD, TOTAL	5.4			MS	5	0.088	0.01	0.044	
7439-95-4	MAGNESIUM, TOTAL	5910	J	*E	MS	5	8.8	0.40	7.0	LD
7439-96-5	MANGANESE, TOTAL	466	J		MS	25	1.8	0.09	1.1	OT
7439-97-6	MERCURY, TOTAL	0.02	J		CV	1	0.036	0.01	0.019	
7440-02-0	NICKEL, TOTAL	6.2	J		MS	5	0.18	0.02	0.10	OT
7440-09-7	POTASSIUM, TOTAL	1630	J	N*	MS	5	88	4.01	35	MSH
7782-49-2	SELENIUM, TOTAL	0.30	U		MS	5	0.44	0.03	0.26	MSL
7440-22-4	SILVER, TOTAL	0.01	J		MS	5	0.088	0.01	0.035	
7440-23-5	SODIUM, TOTAL	258	J	E	MS	5	88	0.94	35	SD
7440-28-0	THALLIUM, TOTAL	0.03	J		MS	5	0.18	0.01	0.035	
7440-62-2	VANADIUM, TOTAL	82.0			MS	5	0.44	0.07	0.35	
7440-66-6	ZINC, TOTAL	57.8			MS	5	0.88	0.08	0.70	

Bottle ID: E

10/28/10

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services | **Client Field ID:** PQIR-SB02-0709-0810

Matrix: SOIL | **SDG Name:** SD4910

Percent Solids: 86.0 | **Lab Sample ID:** SD4910-004

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD	
7429-90-5	ALUMINUM, TOTAL	39400	J	*	MS	50	240	3.54	32	LD
7440-36-0	ANTIMONY, TOTAL	0.08	J	N*	MS	5	0.081	0.01	0.041	MSL
7440-38-2	ARSENIC, TOTAL	0.64			MS	5	0.41	0.09	0.32	
7440-39-3	BARIUM, TOTAL	224	J		MS	5	0.16	0.02	0.16	OT
7440-41-7	BERYLLIUM, TOTAL	0.34			MS	5	0.081	0.01	0.016	
7440-43-9	CADMIUM, TOTAL	0.08			MS	5	0.081	0.01	0.016	
7440-70-2	CALCIUM, TOTAL	5370	J	*	MS	5	8.1	2.03	6.5	LD
7440-47-3	CHROMIUM, TOTAL	27.0	J	N*	MS	5	0.24	0.05	0.16	OT
7440-48-4	COBALT, TOTAL	18.4			MS	5	0.081	0.01	0.024	
7440-50-8	COPPER, TOTAL	85.4	J	N	MS	5	0.16	0.04	0.12	OT
7439-89-6	IRON, TOTAL	39700			MS	5	8.1	1.39	6.5	
7439-92-1	LEAD, TOTAL	2.0			MS	5	0.081	0.01	0.041	
7439-95-4	MAGNESIUM, TOTAL	4490	J	*E	MS	5	8.1	0.37	6.5	LD
7439-96-5	MANGANESE, TOTAL	2360	J		MS	50	3.2	0.16	2.0	OT
7439-97-6	MERCURY, TOTAL	0.01	J		CV	1	0.035	0.01	0.018	
7440-02-0	NICKEL, TOTAL	16.6	J		MS	5	0.16	0.02	0.098	OT
7440-09-7	POTASSIUM, TOTAL	1450	J	N*	MS	5	81	3.71	32	MSH
7782-49-2	SELENIUM, TOTAL	0.24 ~~0.23~~	J	U	MS	5	0.41	0.03	0.24	MRL
7440-22-4	SILVER, TOTAL	0.032	U		MS	5	0.081	0.01	0.032	
7440-23-5	SODIUM, TOTAL	329	J	E	MS	5	81	0.87	32	SD
7440-28-0	THALLIUM, TOTAL	0.05	J		MS	5	0.16	0.01	0.032	
7440-62-2	VANADIUM, TOTAL	128			MS	5	0.41	0.06	0.32	
7440-66-6	ZINC, TOTAL	33.5			MS	5	0.81	0.08	0.65	

Bottle ID: E

CK 10/28/10

Comments:

received CR 10/25/10

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** QIR-SB02P-0709-0810

Matrix: SOIL **SDG Name:** SD4910

Percent Solids: 81.7 **Lab Sample ID:** SD4910-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	ADJUSTED LOD	
7429-90-5	ALUMINUM, TOTAL	39200	J	~~*~~	MS	50	280	4.10	38	LD
7440-36-0	ANTIMONY, TOTAL	0.09	J	~~N*~~	MS	5	0.094	0.01	0.047	MSL
7440-38-2	ARSENIC, TOTAL	0.53			MS	5	0.47	0.11	0.38	
7440-39-3	BARIUM, TOTAL	121	J		MS	5	0.19	0.02	0.19	OT
7440-41-7	BERYLLIUM, TOTAL	0.40			MS	5	0.094	0.01	0.019	
7440-43-9	CADMIUM, TOTAL	0.05	J		MS	5	0.094	0.01	0.019	
7440-70-2	CALCIUM, TOTAL	6020	J	~~*~~	MS	5	9.4	2.35	7.5	LD
7440-47-3	CHROMIUM, TOTAL	26.0	J	~~N*~~	MS	5	0.28	0.06	0.19	OT
7440-48-4	COBALT, TOTAL	21.4			MS	5	0.094	0.01	0.028	
7440-50-8	COPPER, TOTAL	77.2	J	~~N~~	MS	5	0.19	0.05	0.14	OT
7439-89-6	IRON, TOTAL	39200			MS	5	9.4	1.61	7.5	
7439-92-1	LEAD, TOTAL	2.0			MS	5	0.094	0.01	0.047	
7439-95-4	MAGNESIUM, TOTAL	4340	J	~~*E~~	MS	5	9.4	0.42	7.5	LD
7439-96-5	MANGANESE, TOTAL	1100	J		MS	50	3.8	0.19	2.4	OT
7439-97-6	MERCURY, TOTAL	0.01	J		CV	1	0.036	0.01	0.019	
7440-02-0	NICKEL, TOTAL	13.2	J		MS	5	0.19	0.02	0.11	OT
7440-09-7	POTASSIUM, TOTAL	1480	J	~~N*~~	MS	5	94	4.29	38	MSH
7782-49-2	SELENIUM, TOTAL	0.28 ~~0.20~~	J	UL	MS	5	0.47	0.03	0.28	MBL
7440-22-4	SILVER, TOTAL	0.02	J		MS	5	0.094	0.01	0.038	
7440-23-5	SODIUM, TOTAL	350	J	~~E~~	MS	5	94	1.00	38	SD
7440-28-0	THALLIUM, TOTAL	0.04	J		MS	5	0.19	0.01	0.038	
7440-62-2	VANADIUM, TOTAL	116			MS	5	0.47	0.07	0.38	
7440-66-6	ZINC, TOTAL	29.0			MS	5	0.94	0.09	0.75	

CR 10/28/10

Bottle ID: E

Comments:

FORM I - IN

REISSUE

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: QIR-SS02P-0709-0810
Matrix: SOIL
SDG Name: SD4910
Percent Solids: 81.7
Lab Sample ID: SD4910-005

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7429-90-5	ALUMINUM, TOTAL	39200		*	MS	50	280	4.10	38
7440-36-0	ANTIMONY, TOTAL	0.09	J	N*	MS	5	0.094	0.01	0.047
7440-38-2	ARSENIC, TOTAL	0.53			MS	5	0.47	0.11	0.38
7440-39-3	BARIUM, TOTAL	121			MS	5	0.19	0.02	0.19
7440-41-7	BERYLLIUM, TOTAL	0.40			MS	5	0.094	0.01	0.019
7440-43-9	CADMIUM, TOTAL	0.05	J		MS	5	0.094	0.01	0.019
7440-70-2	CALCIUM, TOTAL	6020		*	MS	5	9.4	2.35	7.5
7440-47-3	CHROMIUM, TOTAL	26.0		N*	MS	5	0.28	0.06	0.19
7440-48-4	COBALT, TOTAL	21.4			MS	5	0.094	0.01	0.028
7440-50-8	COPPER, TOTAL	77.2		N	MS	5	0.19	0.05	0.14
7439-89-6	IRON, TOTAL	39200			MS	5	9.4	1.61	7.5
7439-92-1	LEAD, TOTAL	2.0			MS	5	0.094	0.01	0.047
7439-95-4	MAGNESIUM, TOTAL	4340		*E	MS	5	9.4	0.42	7.5
7439-96-5	MANGANESE, TOTAL	1100			MS	50	3.8	0.19	2.4
7439-97-6	MERCURY, TOTAL	0.01	J		CV	1	0.036	0.01	0.019
7440-02-0	NICKEL, TOTAL	13.2			MS	5	0.19	0.02	0.11
7440-09-7	POTASSIUM, TOTAL	1480		N*	MS	5	94	4.29	38
7782-49-2	SELENIUM, TOTAL	0.20	J		MS	5	0.47	0.03	0.28
7440-22-4	SILVER, TOTAL	0.02	J		MS	5	0.094	0.01	0.038
7440-23-5	SODIUM, TOTAL	350		E	MS	5	94	1.00	38
7440-28-0	THALLIUM, TOTAL	0.04	J		MS	5	0.19	0.01	0.038
7440-62-2	VANADIUM, TOTAL	116			MS	5	0.47	0.07	0.38
7440-66-6	ZINC, TOTAL	29.0			MS	5	0.94	0.09	0.75

Bottle ID: E

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** PQIR-SS01-0405-0810

Matrix: SOIL **SDG Name:** SD4910

Percent Solids: 84.0 **Lab Sample ID:** SD4910-008

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD	
7429-90-5	ALUMINUM, TOTAL	33800	J	*	MS	25	140	2.01	18	LA
7440-36-0	ANTIMONY, TOTAL	0.62	J	N*	MS	5	0.092	0.01	0.046	MBL
7440-38-2	ARSENIC, TOTAL	0.99			MS	5	0.46	0.11	0.37	
7440-39-3	BARIUM, TOTAL	81.4	J		MS	5	0.18	0.02	0.18	OT
7440-41-7	BERYLLIUM, TOTAL	0.37			MS	5	0.092	0.01	0.018	
7440-43-9	CADMIUM, TOTAL	0.03	J		MS	5	0.092	0.01	0.018	
7440-70-2	CALCIUM, TOTAL	6500	J	*	MS	5	9.2	2.30	7.4	LD
7440-47-3	CHROMIUM, TOTAL	16.1	J	N*	MS	5	0.28	0.06	0.18	OT
7440-48-4	COBALT, TOTAL	11.7			MS	5	0.092	0.01	0.028	
7440-50-8	COPPER, TOTAL	52.0	J	N	MS	5	0.18	0.05	0.14	OT
7439-89-6	IRON, TOTAL	35300			MS	5	9.2	1.57	7.4	
7439-92-1	LEAD, TOTAL	2.1			MS	5	0.092	0.01	0.046	
7439-95-4	MAGNESIUM, TOTAL	4980	J	*E	MS	5	9.2	0.42	7.4	LA
7439-96-5	MANGANESE, TOTAL	551	J		MS	25	1.8	0.09	1.2	OT
7439-97-6	MERCURY, TOTAL	0.020	U		CV	1	0.040	0.01	0.020	
7440-02-0	NICKEL, TOTAL	7.1	J		MS	5	0.18	0.02	0.11	OT
7440-09-7	POTASSIUM, TOTAL	1310	J	N*	MS	5	92	4.21	37	MSH
7782-49-2	SELENIUM, TOTAL	0.43	J	N	MS	5	0.46	0.03	0.28	MBL
7440-22-4	SILVER, TOTAL	0.02	J		MS	5	0.092	0.01	0.037	
7440-23-5	SODIUM, TOTAL	394	J	E	MS	5	92	0.98	37	SD
7440-28-0	THALLIUM, TOTAL	0.04	J		MS	5	0.18	0.01	0.037	
7440-62-2	VANADIUM, TOTAL	114			MS	5	0.46	0.07	0.37	
7440-66-6	ZINC, TOTAL	28.1			MS	5	0.92	0.09	0.74	

Bottle ID: M

CR 10/28/10

Comments:

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** PQIR-SB01-0810-0810

Matrix: SOIL **SDG Name:** SD4910

Percent Solids: 85.9 **Lab Sample ID:** SD4910-009

Concentration Units : mg/Kgdrywt

CAS No.	Analyte	Concentration	C	Q	M	DF	ADJUSTED LOQ	MDL	LOD	
7429-90-5	ALUMINUM, TOTAL	20600	J	~~*~~	MS	25	140	1.96	18	LA
7440-36-0	ANTIMONY, TOTAL	0.045 ~~0.04~~	~~J~~	~~N*~~ U	MS	5	0.090	0.01	0.045	~~MBL~~ CCB
7440-38-2	ARSENIC, TOTAL	0.49			MS	5	0.45	0.10	0.36	
7440-39-3	BARIUM, TOTAL	103	J		MS	5	0.18	0.02	0.18	OT
7440-41-7	BERYLLIUM, TOTAL	0.22			MS	5	0.090	0.01	0.018	
7440-43-9	CADMIUM, TOTAL	0.06	J		MS	5	0.090	0.01	0.018	
7440-70-2	CALCIUM, TOTAL	14100	J	~~*~~	MS	5	9.0	2.25	7.2	LD
7440-47-3	CHROMIUM, TOTAL	20.8	J	~~N*~~	MS	5	0.27	0.05	0.18	OT
7440-48-4	COBALT, TOTAL	12.1			MS	5	0.090	0.01	0.027	
7440-50-8	COPPER, TOTAL	65.9	J	~~N~~	MS	5	0.18	0.05	0.14	OT
7439-89-6	IRON, TOTAL	30800			MS	5	9.0	1.54	7.2	
7439-92-1	LEAD, TOTAL	1.5			MS	5	0.090	0.01	0.045	
7439-95-4	MAGNESIUM, TOTAL	5160	J	~~*E~~	MS	5	9.0	0.41	7.2	LD
7439-96-5	MANGANESE, TOTAL	789	J		MS	25	1.8	0.09	1.1	OT
7439-97-6	MERCURY, TOTAL	0.017	U		CV	1	0.033	0.01	0.017	
7440-02-0	NICKEL, TOTAL	9.0	J		MS	5	0.18	0.02	0.11	OT
7440-09-7	POTASSIUM, TOTAL	1540	J	~~N*~~	MS	5	90	4.11	36	MSH
7782-49-2	SELENIUM, TOTAL	0.27	U		MS	5	0.45	0.03	0.27	
7440-22-4	SILVER, TOTAL	0.036	U		MS	5	0.090	0.01	0.036	
7440-23-5	SODIUM, TOTAL	402	J	~~E~~	MS	5	90	0.96	36	SD
7440-28-0	THALLIUM, TOTAL	0.03	J		MS	5	0.18	0.01	0.036	
7440-62-2	VANADIUM, TOTAL	127			MS	5	0.45	0.07	0.36	
7440-66-6	ZINC, TOTAL	32.6			MS	5	0.90	0.09	0.72	

Bottle ID: E

Comments:

10/25/10

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: VEPQIR-EB01-081010
Matrix: WATER
SDG Name: SD4910
Percent Solids: 0.00
Lab Sample ID: SD4910-002

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	ADJUSTED LOD
7429-90-5	ALUMINUM, TOTAL	14.2	J		MS	5	300	3.15	40
7440-36-0	ANTIMONY, TOTAL	0.50	U		MS	5	1.0	0.10	0.50
7440-38-2	ARSENIC, TOTAL	1.5	J		MS	5	5.0	0.80	4.0
7440-39-3	BARIUM, TOTAL	1.0	U		MS	5	2.0	0.45	1.0
7440-41-7	BERYLLIUM, TOTAL	0.20	U		MS	5	1.0	0.05	0.20
7440-43-9	CADMIUM, TOTAL	0.20	U		MS	5	1.0	0.05	0.20
7440-70-2	CALCIUM, TOTAL	80	U		MS	5	100	37.25	80
7440-47-3	CHROMIUM, TOTAL	1.0	J		MS	5	3.0	0.30	2.0
7440-48-4	COBALT, TOTAL	0.07	J		MS	5	1.0	0.05	0.30
7440-50-8	COPPER, TOTAL	0.75	J		MS	5	2.0	0.35	1.5
7439-89-6	IRON, TOTAL	60	U		MS	5	100	18.50	60
7439-92-1	LEAD, TOTAL	0.50	U		MS	5	1.0	0.10	0.50
7439-95-4	MAGNESIUM, TOTAL	31.9	J		MS	5	100	12.75	80
7439-96-5	MANGANESE, TOTAL	0.58	J		MS	5	4.0	0.25	2.5
7439-97-6	MERCURY, TOTAL	0.10	U		CV	1	0.20	0.04	0.10
7440-02-0	NICKEL, TOTAL	1.2	U		MS	5	2.0	0.20	1.2
7440-09-7	POTASSIUM, TOTAL	400	U		MS	5	1000	135.35	400
7782-49-2	SELENIUM, TOTAL	3.0	U		MS	5	5.0	0.50	3.0
7440-22-4	SILVER, TOTAL	0.40	U		MS	5	1.0	0.05	0.40
7440-23-5	SODIUM, TOTAL	50.4	J		MS	5	1000	28.25	400
7440-28-0	THALLIUM, TOTAL	0.40	U		MS	5	2.0	0.05	0.40
7440-62-2	VANADIUM, TOTAL	4.0	U		MS	5	5.0	0.60	4.0
7440-66-6	ZINC, TOTAL	1.8	J		MS	5	10	1.60	8.0

Bottle ID: E

Comments:

10/28/10

FORM I - IN

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services
Client Field ID: VEPQIR-EB01-081110
Matrix: WATER
SDG Name: SD4910
Percent Solids: 0.00
Lab Sample ID: SD4910-007

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	LOQ	ADJUSTED MDL	LOD
7429-90-5	ALUMINUM, TOTAL	16.3	J		MS	5	300	3.15	40
7440-36-0	ANTIMONY, TOTAL	0.50	U		MS	5	1.0	0.10	0.50
7440-38-2	ARSENIC, TOTAL	0.90	J		MS	5	5.0	0.80	4.0
7440-39-3	BARIUM, TOTAL	1.0	U		MS	5	2.0	0.45	1.0
7440-41-7	BERYLLIUM, TOTAL	0.20	U		MS	5	1.0	0.05	0.20
7440-43-9	CADMIUM, TOTAL	0.20	U		MS	5	1.0	0.05	0.20
7440-70-2	CALCIUM, TOTAL	41.9	J		MS	5	100	37.25	80
7440-47-3	CHROMIUM, TOTAL	1.0	J		MS	5	3.0	0.30	2.0
7440-48-4	COBALT, TOTAL	0.30	U		MS	5	1.0	0.05	0.30
7440-50-8	COPPER, TOTAL	1.5	U		MS	5	2.0	0.35	1.5
7439-89-6	IRON, TOTAL	25.0	J		MS	5	100	18.50	60
7439-92-1	LEAD, TOTAL	0.16	J		MS	5	1.0	0.10	0.50
7439-95-4	MAGNESIUM, TOTAL	35.5	J		MS	5	100	12.75	80
7439-96-5	MANGANESE, TOTAL	0.79	J		MS	5	4.0	0.25	2.5
7439-97-6	MERCURY, TOTAL	0.10	U		CV	1	0.20	0.04	0.10
7440-02-0	NICKEL, TOTAL	1.2	U		MS	5	2.0	0.20	1.2
7440-09-7	POTASSIUM, TOTAL	400	U		MS	5	1000	135.35	400
7782-49-2	SELENIUM, TOTAL	3.0	U		MS	5	5.0	0.50	3.0
7440-22-4	SILVER, TOTAL	0.40	U		MS	5	1.0	0.05	0.40
7440-23-5	SODIUM, TOTAL	57.4	J		MS	5	1000	28.25	400
7440-28-0	THALLIUM, TOTAL	0.40	U		MS	5	2.0	0.05	0.40
7440-62-2	VANADIUM, TOTAL	4.0	U		MS	5	5.0	0.60	4.0
7440-66-6	ZINC, TOTAL	2.4	J		MS	5	10	1.60	8.0

OT

OT

Bottle ID: E

10/28/10

Comments:

FORM I - IN

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-3
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
PQIR-SS02-0304-0810	SL	10-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	28000 ug/gdrywt	500	250	LLOYDKAHN	WG81226	13-AUG-10 14:58:51	N/A	N/A	
* Total Cyanide	U0.48 mg/Kgdrywt	0.60	0.48	SW846 M9012A	WG81166	18-AUG-10 14:39:24	SW846 M9012	N/A	
Total Solids	81. %	1	N/A	SM2540G	WG81210	20-AUG-10 09:15:00	ASTM D2216	19-AUG-10	
pH(Soil)	8.0 pH	0.10	N/A	SW846 9045C	WG80997	13-AUG-10 11:15:00	SW846 9045C	13-AUG-10	

* validated result

OR
10/28/10

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-4
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
PQIR-SB02-0709-0810	SL	10-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	12000 ug/gdrywt	460	230	LLOYDKAHN	WG81226	13-AUG-10 12:43:52	N/A	N/A	
* Total Cyanide	U0.44 mg/Kgdrywt	0.55	0.44	SW846 M9012A	WG81166	18-AUG-10 14:39:25	SW846 M9012	N/A	
Total Solids	86. %	1	N/A	SM2540G	WG81210	20-AUG-10 09:16:00	ASTM D2216	19-AUG-10	
pH(Soil)	7.8 pH	0.10	N/A	SW846 9045C	WG80997	13-AUG-10 11:07:00	SW846 9045C	13-AUG-10	

* validated result

CR 10/28/10

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

received
CR 10/25/10

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-5
Report Date: 21-OCT-10
Client PO: 939676, N62470-08-D-1000, 404422
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
QIR-SB02P-0709-0810	SL	10-AUG-10	12-AUG-10

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Analyst	Footnotes
TOC In Soil	9500 ug/gdrywt	490	LLOYDKAHN	WG81226	13-AUG-10 15:41:17	N/A	N/A	JG	
Total Cyanide	U0.48 mg/Kgdrywt	0.60	SW846 M9012A	WG81166	18-AUG-10 14:39:26	SW846 M9012	N/A	CP	
Total Solids	82. %	1	SM2540G	WG81210	20-AUG-10 09:17:00	ASTM D2216	19-AUG-10	JF	
pH(Soil)	8.2 pH	0.10	SW846 9045C	WG80997	13-AUG-10 11:05:00	SW846 9045C	13-AUG-10	JF	

* validate result

CR
10/28/10

10 Technology Way
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h:(207) 871-7400 Fax:(207) 775-4029
http://katahdinlab.com
sales@katahdinlab.com

REISSUE

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-5
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
QIR-~~SS~~02P-0709-0810 SB	SL	10-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	9500 ug/gdrywt	490	240	LLOYDKAHN	WG81226	13-AUG-10 15:41:17	N/A	N/A	
* Total Cyanide	U0.48 mg/Kgdrywt	0.60	0.48	SW846 M9012A	WG81166	18-AUG-10 14:39:26	SW846 M9012	N/A	
Total Solids	82. %	1	N/A	SM2540G	WG81210	20-AUG-10 09:17:00	ASTM D2216	19-AUG-10	
pH(Soil)	8.2 pH	0.10	N/A	SW846 9045C	WG80997	13-AUG-10 11:05:00	SW846 9045C	13-AUG-10	

* validated result

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Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-8
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
PQIR-SS01-0405-0810	SL	11-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	4000 ug/gdrywt	480	240	LLOYDKAHN	WG81619	25-AUG-10 15:41:44	N/A	N/A	
* Total Cyanide	U0.48 mg/Kgdrywt	0.60	0.48	SW846 M9012A	WG81166	18-AUG-10 14:39:28	SW846 M9012	N/A	
Total Solids	84. %	1	N/A	SM2540G	WG81210	20-AUG-10 09:18:00	ASTM D2216	19-AUG-10	
pH(Soil)	7.8 pH	0.10	N/A	SW846 9045C	WG80997	13-AUG-10 11:12:00	SW846 9045C	13-AUG-10	

* validated result

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Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-9
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
PQIR-SB01-0810-0810	SL	11-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
TOC In Soil	1100 ug/gdrywt	460	230	LLOYDKAHN	WG81226	13-AUG-10 16:11:31	N/A	N/A	
* Total Cyanide	U0.44 mg/Kgdrywt	0.55	0.44	SW846 M9012A	WG81166	18-AUG-10 14:39:29	SW846 M9012	N/A	
Total Solids	86. %	1	N/A	SM2540G	WG81210	20-AUG-10 09:19:00	ASTM D2216	19-AUG-10	
pH(Soil)	7.8 pH	0.10	N/A	SW846 9045C	WG80997	13-AUG-10 11:14:00	SW846 9045C	13-AUG-10	

* validated result

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-2
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
VEPQIR-EB01-081010	AQ	10-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Cyanide	U8.0 ug/L	10.	8.0	SW846 M9012A	WG81165	18-AUG-10 14:39:23	SW846 M9012	N/A	

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: Juan Acaron
CH2M Hill
3011 S.W. Williston Rd.
Gainesville,FL 32608-3928

Lab Sample ID: SD4910-7
Report Date: 07-SEP-10
Client PO: 939676, N62470-08-D-
Project: CTO-111 NTR Vieques
SDG: SD4910

Sample Description	Matrix	Date Sampled	Date Received
VEPQIR-EB01-081110	AQ	11-AUG-10	12-AUG-10

Parameter	Result	Adj LOQ	Adj LOD	Anal. Method	QC.Batch	Anal. Date	Prep. Method	Prep. Date	Footnotes
Total Cyanide	U8.0 ug/L	10.	8.0	SW846 M9012A	WG81165	18-AUG-10 14:39:27	SW846 M9012	N/A	

VOLATILE DATA VALIDATION SUMMARY

Site Name: Vieques CTO-111
Project Number: 617.90.01
Sampling Date(s): 8/10, 8/11/2010

Laboratory: Katahdin
Case/Order No. SD4910

Compound List: ☑ TCL ☐ Priority Pollutant ☐ Appendix IX ☐ Other ____

Method: ☐ CLP SOW ☐ 40 CFR 136 ☑ SW-846 Method 8260B ☐ Other____

The following table indicates the data validation criteria examined, any problems identified, and the QA action applied.

Data Validation Criteria:	Accept	FYI	Qualify	Comments
Holding Times	✓			
GC/MS Tuning	✓			
Initial Calibrations	✓			
Continuing Calibrations			✓	Bromomethane (UJ) in -9
Blank Analysis Results			✓	carbondisulfide 1LOD(U) in all samples
System Monitoring/Surrogate Results	✓			
MS/MSD Results	✓			
Field Duplicate Results	✓			
Internal Standard Areas/RT	✓			
Target Compound Identification	✓			
TIC Identification NA				
Quantitation/Detection Limits	✓			
System Performance	✓			
Overall Assessment of Data	✓			
Other LCS	✓			

General Comments:

Accept – No qualification required.
FYI – For your information only, no qualification necessary
Qualify – Qualify as rejected, estimated or biased
NA – Not applicable.
NR – Not reviewed.

QA Scientist [signature]
Date 10/28/10

Revised 12/11/2000

SOP # HW-24
Revision # 2
August 2008

USEPA
Hazardous Waste Support Branch
Validating Volatile Organic Compounds
By Gas Chromatography/Mass Spectrometry
SW-846 Method 8260B

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

Prepared by: Russell Arnone Date: 8/25/08
Russell Arnone, Chemist
Hazardous Waste Support Section

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

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

Annual Review

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

Reviewed by: _____ Date: _____
Name

Scope and Applicability

This SOP offers detailed guidance in evaluating laboratory data generated according to the USEPA SW-846, Method 8260B December 1996. The validation methods and actions discussed in this document are based on the requirements set forth in USEPA SW-846, Method 8260B and Method 8000C, Rev 3, March 2003; and "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," January, 2005. This document covers technical as well as method specific problems; however situations may arise where data limitations must be assessed based on the reviewer's own professional judgement.

Summary

To ensure a thorough evaluation of each result in a data case, the reviewer must complete the checklist within this SOP, answering specific questions while performing the prescribed "ACTIONS" in each section. Qualifiers (or flags) are applied to questionable or unusable results as instructed. The data qualifiers discussed in this document are defined on page 4.

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

DEFINITIONS

Acronyms

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

TOPO - Task Order Project Officer
TPO - Technical Project Officer
VOA - Volatile organic
VTSR - Validated Time of Sample Receipt

Data Qualifiers

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

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

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

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

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

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

LAB QUALIFIERS:

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

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

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

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

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

YES NO N/A

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ LAB: Katahdin

SITE NAME: Vieques CTO-111

1.0 Data Completeness and Deliverables

1.1 Has all data been submitted in CLP deliverable format or CLP Forms Equivalent? [✓] ___ ___

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

2.0 Cover Letter, SDG Narrative

2.1 Is a laboratory narrative, and/or cover letter signed release present? [✓] ___ ___

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

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

II. VOLATILE ANALYSES

1.0 Traffic Reports and Laboratory Narrative

1.1 Are the Traffic Reports, and/or Chain of Custodies from the field samplers present for all samples sign release present? [✓] ___ ___

ACTION: If no, contact the laboratory/sampling team for replacement of missing or illegible copies.

1.2 Is a sampling trip report present (if required)? [✓] ___ ___

1.3 Sample Conditions/Problems

YES NO N/A

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

ACTION: If all the VOA vials for a sample have air bubbles or the VOA vial analyzed had air bubbles, flag all positive results "J" and all non-detects "R".

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

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

2.0 Holding Times

2.1 Have any volatile holding times, determined from date of collection to date of analysis, been exceeded? ___ [✓] ___

The maximum holding time for aqueous samples is 14 days.

The maximum holding time for soils non aqueous samples is 14 days.

NOTE: If unpreserved, aqueous samples maintained at 4°C for aromatic hydrocarbons analysis must be analyzed within 7 days. If preserved with HCL acid to a pH<2 and stored at 4°C, then aqueous samples must be analyzed within 14 days from time of collection. For non-aqueous samples for volatile components that are frozen (less than 7°C) or are properly cooled (4°C ± 2°C) and perserved with $NaHSO_4$, the maximum holding time is 14 days from sample collection. If

Sample_Name	Lab_Sample_ID	DateTime_	Extraction_	Analysis_D	EHT	AHT	Analytical_Method	SDG
VEPQIR-TB01-081010	SD4910-1	8/10/2010	8/19/2010	8/19/2010		9	8260B	SD4910
VEPQIR-EB01-081010	SD4910-2	8/10/2010	8/19/2010	8/19/2010		9	8260B	SD4910
VEPQIR-SS02-0304-0810	SD4910-3	8/10/2010	8/16/2010	8/16/2010		6	8260B	SD4910
VEPQIR-SB02-0709-0810	SD4910-4	8/10/2010	8/16/2010	8/16/2010		6	8260B	SD4910
VEPQIR-SB02P-0709-0810	SD4910-5	8/10/2010	8/16/2010	8/16/2010		6	8260B	SD4910
VEPQIR-TB01-081110	SD4910-6	8/11/2010	8/20/2010	8/20/2010		9	8260B	SD4910
VEPQIR-EB01-081110	SD4910-7	8/11/2010	8/20/2010	8/20/2010		9	8260B	SD4910
VEPQIR-SS01-0405-0810	SD4910-8	8/11/2010	8/16/2010	8/16/2010		5	8260B	SD4910
VEPQIR-SB01-0810-0810	SD4910-9	8/11/2010	8/17/2010	8/17/2010		6	8260B	SD4910

OK
OK 10/29/10

YES NO N/A

uncertain about preservation, contact the laboratory /sampling team to determine whether or not samples were preserved.

ACTION: Qualify sample results according to Table 1:

Table 1. Holding Time Actions for Trace Volatile Analysis

Matrix	Preserved	Criteria	Action	
			Detected Associated Compounds	Non-Detected Associated Compounds
Aqueous	No	≤7 days	No qualifications	
	No	> 7 days	J	R
	Yes	≤14 days	No qualifications	
	Yes	> 14 days	J	R
Non Aqueous	No	≤ 14 days	J	R
	Yes	≤ 14 days	No qualifications	
	Yes/No	> 14 days	J	R

3.0 Surrogate Recovery (CLP Form II Equivalent)

3.1 Have the volatile surrogate recoveries been listed on Surrogate Recovery forms for each of the following matrices:

a. Water [✓] ___ ___

b. Soil [✓] ___ ___

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

a. Water [✓] ___ ___

b. Soil [✓] ___ ___

ACTION: If large errors exist, deliverables are unavailable or information is missing, document the effect(s) in Data

YES NO N/A

Assessments and contact the laboratory/project officer/appropriate official for an explanation /resubmittal, make any necessary corrections and document effect in the Data Assessment.

3.3 Were the surrogate recovery limits followed per Table 2. If Table 2 criteria were not followed, the laboratory may use in-house performance criteria (per SW-846, Method 8000C, section 9.7). Other compounds may be used as surrogates, depending upon the analysis requirements. [✓] ___ ___

Table 2. Surrogate Spike Recovery Limits for Water and Soil/Sediments

DMC	Recovery Limits (%)Water	Recovery Limits Soil/Sediment
4-Bromofluorobenzene	80-120	70-130
Dibromofluoromethane	80-120	70-130
Toluene-d_8	80-120	70-130
Dichloroethane-d_4	80-120	70-130

Note: Use above table if laboratory did not provide in house recovery criteria.

Note: Other compounds may be used as surrogated depending upon the analysis requirements.

3.4 Were outliers marked correctly with an asterisk? [ ] ___ ✓

ACTION: Circle all outliers with a red pencil.

3.5 Were one or more volatile surrogate recoveries out of specification for any sample or method blank. Table 2. [ ] ✓ ___

If yes, were samples reanalyzed? [ ] ___ ✓

Were method blanks reanalyzed? [ ] ___ ✓

YES NO N/A

ACTION: If all surrogate recoveries are > 10% but 1 or more compounds do not meet method specifications:

1. Flag all positive results as estimated ("J").
2. Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.
3. If recoveries are greater than the upper acceptance limit, do not qualify non-detects, but qualify positive results as estimated "J".

If any surrogate has a recovery of < 10%:

1. Positive results are qualified with ("J").
2. Non-detects for that should be qualified as unusable ("R").

NOTE: Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and reanalyses. The basic concern is whether the blank problems represent an isolated problem with the blank alone or whether there is a fundamental problem with the analytical process. If one or more samples in the batch show acceptable surrogate recoveries, the reviewer may choose the blank problem to be an isolated occurrence.

3.6 Are there any transcription/calculation errors between raw data and reported data? [ ] [✓] ___

ACTION: If large errors exist, take action as specified in section 3.2 above.

4.0 <u>Laboratory Control Sample(Form III/Equivalent)</u>

4.1 Is the LCS prepared, extracted, analyzed, and reported once for every 20 field samples of a similar matrix, per SDG. [✓] ___ ___

YES NO N/A

Note: LCS consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same weight or volume.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation /resubmittals. Make note in the data assessment.

4.2 Were the Laboratory Control Samples analyzed at the required frequency for each of the following matrices:

A.	Water	[✓]	___	___
B.	Soil	[✓]	___	___
C.	Med Soil	[ ]	___	✓

Note: The LCS is spiked with the same analytes at the same concentrations as the matrix spike (SW-846 8000C, Section 9.5). If different make note in data assessment. Matrix/LCS spiking standards should be prepared from volatile organic compounds which are representative of the compounds being investigating. At a minimum, the matrix spike should include 1,1-dichloroethene, trichloroethene, chlorobenzene, toluene, and benzene.

ACTION: If any MS/MD, MS/MSD or replicate data are missing, take the action specified in 3.2 above.

4.3 Have in house LCS recovery limits been developed (Method 8000C, Sect 9.7). [✓] ___ ___

4.4 If in house limits are not developed, are LCS acceptance recovery limits between 70 - 130% (Method 8000c Sect 9.5)? [ ] ___ ✓

4.5 Were one or more of the volatile LCS recoveries outside the in house laboratory recovery criteria for spiked analytes? If in house limits are not present use 70 - 130% recovery limits. [ ] ✓ ___

YES NO N/A

Table 3. LCS Actions for Volatile Analysis

Criteria	Action	
	Detected Spiked Compounds	Non-Detected Spiked Compounds
%R > Upper Acceptance Limit	J	No Qualifiers
%R < Lower Acceptance Limit	J	UJ
Lower Acceptance Limit ≤ %R	No Qualifications	

5.0 Matrix Spikes(Form III or equivalent)

5.1 Are all data for matrix spike and matrix duplicate or matrix spike duplicate (MS/MD or MS/MSD) present and complete for each matrix? [✓] ___ ___

Soil only

NOTE: The laboratory should use one matrix spike and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If the sample is not expected to contain target analytes, a MS/MSD should be analyzed (SW-846, Method 8260B, Sect 8.4.2).

5.2 Have MS/MD 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.

5.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/MD, MS/MSD or laboratory replicate must be performed for every 20 samples

YES NO N/A

of similar matrix or concentration level. Laboratories analyzing one to ten samples per month are required to analyze at least one MS per month [page 8000C, section 9.5.])

a. Water [ ] ___ ✓

b. Waste [ ] ___ ✓

c. Soil/Solid [✓] ___ ___

Note: The LCS is spiked with the same analytes at the same concentrations as the matrix spike (SW-846 8000C, Section 9.5). If different make note in data assessment. Matrix/LCS spiking standards should be prepared from volatile organic compounds which are representative of the compounds being investigating. At a minimum, the matrix spike should include 1,1-dichloroethene, trichloroethene, chlorobenzene, toluene, and benzene. The concentration of the LCS should be determined as described SW-Method 8000C Section 9.5.

ACTION: If any MS/MD, MS/MSD or replicate data are missing, take the action specified in 3.2 above.

5.4 Have in house MS recovery limits been developed (Method 8000C, Sect 9.7) for each matrix. [✓] ___ ___

5.5 Were one or more of the volatile MS/MSD recoveries outside of the in-house laboratory recovery criteria for spiked analytes? If none are present, then use 70-130% recovery as per SW-846, 8000C, Sect. 9.5.4. [✓] ___ ___

ACTION: Circle all outliers with a red pencil.

NOTE: If any individual % recovery in the MS (or MSD) falls outside the designated range for recovery the reviewer should determine if there is a matrix effect. A matrix effect is indicated if the LCS data are within limits but the MS data exceeds the limits.

KATAHDIN ANALYTICAL SERVICES
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client: CH2MHill
Project: CTO-111 NTR Vieques
PO No:
Sample Date: 08/11/10
Received Date: 08/12/10
Extraction Date:
Analysis Date: 08/16/10
Report Date: 09/01/2010
Matrix: SOIL

Lab ID: WG81025-3 & WG81025-4
Client ID: R-SS01-0405-0810MS & R-SS01-0405-0810MSD
SDG: SD4910
Extracted by:
Extraction Method: SW846 5035
Analyst: JSS
Analysis Method: SW846 8260B
Lab Prep Batch: WG81025
Units: ug/Kgdrywt

COMPOUND	MS SPIKE	MSD SPIKE	SAMPLE CONC.	MS CONC.	MSD CONC.	MS %REC.	MSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
Dichlorodifluoromethane	62	56	0.00	114	71	* 184	125	* 47	30	45-167
Chloromethane	62	56	0.00	88	74	* 142	* 131	17	30	69-127
Vinyl chloride	62	56	0.00	84	71	* 135	126	16	30	73-134
Bromomethane	62	56	0.00	82	65	132	115	22	30	64-136
Chloroethane	62	56	0.00	83	68	* 133	120	20	30	71-127
Trichlorofluoromethane	62	56	0.00	96	78	* 154	137	21	30	73-145
1,1-Dichloroethene	62	56	0.00	82	71	133	126	15	30	71-137
Carbon Disulfide	62	56	1.8	72	61	113	105	16	30	69-138
Freon-113	62	56	0.00	75	71	121	126	5	30	67-135
Methylene Chloride	62	56	0.00	73	58	118	103	23	30	56-152
Acetone	62	56	7.3	76	69	111	108	10	30	76-213
trans-1,2-Dichloroethene	62	56	0.00	75	64	121	112	16	30	67-133
Methyl tert-butyl ether	124	113	0.00	138	118	111	104	16	30	81-125
1,1-Dichloroethane	62	56	0.00	81	67	* 131	118	19	30	75-126
cis-1,2-Dichloroethene	62	56	0.00	82	67	* 132	118	20	30	82-123
Bromochloromethane	62	56	0.00	77	62	* 124	109	22	30	84-115
Chloroform	62	56	0.00	82	66	* 133	117	22	30	83-118
Carbon Tetrachloride	62	56	0.00	85	72	* 137	* 128	16	30	78-124
1,1,1-Trichloroethane	62	56	0.00	82	68	* 132	* 121	18	30	80-120
2-Butanone	62	56	0.00	67	59	107	105	11	30	78-148
Benzene	62	56	0.00	78	65	* 126	* 115	18	30	82-113
Cyclohexane	62	56	0.00	82	70	* 132	124	16	30	75-128
1,2-Dichloroethane	62	56	0.00	79	64	* 128	112	22	30	83-121
Trichloroethene	62	56	0.00	81	69	* 131	* 122	17	30	83-113
1,2-Dichloropropane	62	56	0.00	78	63	* 126	112	22	30	84-115
Bromodichloromethane	62	56	0.00	78	62	* 126	110	23	30	82-118
cis-1,3-dichloropropene	62	56	0.00	77	62	* 124	109	22	30	80-115
Toluene	62	56	1.9	80	66	* 126	113	19	30	80-113
4-methyl-2-pentanone	62	56	0.00	68	58	109	102	16	30	75-137
Tetrachloroethene	62	56	0.00	82	72	* 132	* 127	13	30	73-122
trans-1,3-Dichloropropene	62	56	0.00	84	67	135	119	22	30	87-136
1,1,2-Trichloroethane	62	56	0.00	76	61	* 122	108	21	30	78-117
Dibromochloromethane	62	56	0.00	76	62	* 123	109	22	30	80-120
1,2-Dibromoethane	62	56	0.00	74	60	119	106	20	30	81-119
2-Hexanone	62	56	0.00	62	52	100	93	16	30	72-149
Chlorobenzene	62	56	0.00	79	66	* 127	* 116	18	30	85-111
Ethylbenzene	62	56	0.00	76	66	* 123	* 116	15	30	81-112
m+p-Xylenes	124	113	0.00	158	134	* 127	* 118	16	30	80-115
o-Xylene	62	56	0.00	77	65	* 124	115	17	30	82-115
Styrene	62	56	0.00	78	64	* 125	* 113	19	30	84-112
Bromoform	62	56	0.00	76	62	123	109	21	30	76-126
Isopropylbenzene	62	56	0.00	93	78	* 150	* 139	17	30	89-136
1,1,2,2-Tetrachloroethane	62	56	0.00	75	61	121	107	21	30	78-122
1,3-Dichlorobenzene	62	56	0.00	77	62	* 124	110	21	30	79-119
1,4-Dichlorobenzene	62	56	0.00	76	61	* 123	108	23	30	80-117

 FORM III VOA-2 C1168.D & C1169.D

No qual necessary. LOS & SS/BS OK
CR 10/28/10

KATAHDIN ANALYTICAL SERVICES
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Client: CH2MHill
Project: CTO-111 NTR Vieques
PO No:
Sample Date: 08/11/10
Received Date: 08/12/10
Extraction Date:
Analysis Date: 08/16/10
Report Date: 09/01/2010
Matrix: SOIL

Lab ID: WG81025-3 & WG81025-4
Client ID: R-SS01-0405-0810MS & R-SS01-0405-0810MSD
SDG: SD4910
Extracted by:
Extraction Method: SW846 5035
Analyst: JSS
Analysis Method: SW846 8260B
Lab Prep Batch: WG81025
Units: ug/Kgdrywt

COMPOUND	MS SPIKE	MSD SPIKE	SAMPLE CONC.	MS CONC.	MSD CONC.	MS %REC.	MSD %REC.	%RPD	%RPD LIMIT	QC. LIMITS
1,2-Dichlorobenzene	62	56	0.00	75	60	* 121	107	22	30	76-118
1,2-Dibromo-3-Chloropropane	62	56	0.00	72	62	116	109	16	30	66-132
1,2,4-Trichlorobenzene	62	56	0.00	69	55	112	97	23	30	61-135
1,2,3-Trichlorobenzene	62	56	0.00	62	51	99	90	19	30	55-134
Methyl Acetate	62	56	0.00	64	58	102	102	9	30	72-133
Methylcyclohexane	62	56	0.00	76	71	123	126	7	30	71-127

FORM III VOA-2

C1168.D & C1169.D

YES NO N/A

NOTE: No qualification of data is necessary on MS and MSD data alone. However, using informed professional judgement, the data reviewer may use MS and MSD results in conjunction with other QC criteria to determine the need for some qualification.

Note: The data reviewer should first try to determine to what extent the results of the MS and MSD affect the associated data. This determination should be made with regard to he MS and MSD sample itself, as well as specific analytes for all samples associated with the MS and MSD.

Note: In those instances where it can be determine that the results of the MS and MSD affect only the sample spiked, limit qualification to this sample only. However, it may be determined through the MS and MSD results that a laboratory is having a systematic problem in the analysis of one or more analytes that affect all associated samples, and the reviewer must use professional judgement to qualify the data from all associated samples.

Note: The reviewer must use professional judgement to determine the need for qualification of non-spiked compounds.

ACTION: Follow criteria in Table 4 when professional judgement deems qualification of sample.

Table 4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Actions for Volatile Analysis

Criteria	Action	
	Detected Spiked Compounds	Non-Detected Spiked Compounds
%R > Upper Acceptance Limit	J	No Qualifiers
%R < Lower Acceptance Limit	J	UJ
Lower Acceptance Limit ≤ %R	No Qualifications	

	YES	NO	N/A
6.0 Blank (CLP Form IV Equivalent)			
6.1 Is the Method Blank Summary form present?	[✓]	___	___
6.2 Frequency of Analysis: Has a method blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch?	[✓]	___	___
6.3 Has a method blank been analyzed for each GC/MS system used ?	[✓]	___	___

ACTION: If any blank data are missing, take action as specified above (section 3.2). If blank data is not available, reject ® all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

6.4 Chromatography: review the blank raw data - chromatograms, quant reports or data system printouts. Is the chromatographic performance (baseline stability) for each instrument acceptable for volatile organic compounds?	[✓]	___	___

7.0 Contamination			
7.1 Do any method/instrument/reagent blanks have positive results for target analytes and/or TICs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for percent moisture where necessary.	[✓]	___	___

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

	YES	NO	N/A
7.2 Do any field/rinse blanks have positive volatile organic compound 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.

ACTION: Follow the directions in Table 5 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Environmental Data Quality, Inc.

BLANK ANALYSIS RESULTS FOR TARGET ORGANIC COMPOUNDS

Date / Time	Fraction V	Fraction SV	Fraction P	MATRIX Aqu.	MATRIX Solid	BLANK TYPE TB	BLANK TYPE MB	BLANK TYPE EB	BLANK TYPE FB	Sample I.D. Number	Assoc. Samples	Contaminant	Conc. µg/L	Conc. µg/Kg	Qualification Limit 5X	Qualification Limit 10X
8/16/10	✓				✓		✓			WG81025	(1)	carbon disulfide		1.5	J	
8/17/10	✓				✓		✓			WG81122	(2)	carbon disulfide		1.3	J	
8/19/10	✓			✓		✓				VEPQIR-TB01-081010	(3)	chloromethane	0.43		J	
8/19/10	✓			✓				✓		VEPQIR-EB01-081010	(3)	chloromethane	0.42		J	
8/20/10	✓			✓		✓				VEPQIR-TB01-081110	(4)	ND				
8/20/10	✓			✓				✓		VEPQIR-EB01-081110	(4)	chloromethane	0.56		J	

Notes: (1) SD4910 - 3, -4, -5, -8 (2) SD4910-9

(3) SS02-0304-0810, SB02-0709-0810, SB02P-0709-0810

(4) SS01-0405-0810, SB01-0810-0810

CP 10/24/10

Carbon disulfide ↑ (LOD) u in all samples
chloromethane ND u all samples

Table 5. Volatile Organic Analysis Blank Contamination Criteria

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Storage, Field, Trip, Instrument**	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 qualify 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 contam-ination	Detects	Qualify results as unusable R

* 2x the CRQL for methylene chloride, 2-butanone, and acetone

** Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 ug/L.

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 volatile organic target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

	YES	NO	N/A
7.3 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.

8.0 GC/MS Apparatus and Materials

8.1 Did the lab use the proper gas chromatographic column(s) for analysis of volatiles by Method 8260B? Check raw data, instrument logs or contact the lab to determine what type of column(s) was (were) used.	[✓]	___	___

NOTE: For the analysis of volatiles, the method requires the use of 60 m. x 0.75 mm capillary column, coated with VOCOL(Supelco) or equivalent column. (see SW-846, page 8260B-7, section 4.9.2)

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

9.0 GC/MS Instrument Performance Check (CLP Form V Equivalent)

9.1 Are the GC/MS Instrument Performance Check forms present for Bromofluorobenzene (BFB), and do these forms list the associated samples with date/time analyzed?	[✓]	___	___
9.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the BFB provided for each twelve hour shift?	[✓]	___	___

9.3 Has an instrument performance check solution (BFB)

YES NO N/A

been analyzed for every twelve hours of sample analysis per instrument?(see Table 4, SW-846, page 8260B-36) [✓] ___ ___

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

ACTION: If the laboratory/project officer cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

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

9.4 Have the ion abundances been normalized to m/z 95? [✓] ___ ___

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

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

ACTION: If ion abundance criteria are not met, take action as specified in section 3.2.

9.6 Are there any transcription/calculation errors between mass lists and reported values? (Check at least two values but if errors are found, check more.) ___ [✓] ___

9.7 Have the appropriate number of significant figures (two) been reported? [✓] ___ ___

ACTION: If large errors exist, take action as specified in section 3.2.

9.8 Are the spectra of the mass calibration compounds acceptable. [✓] ___ ___

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

	YES	NO	N/A

10.0 Target Analytes (CLP Form I Equivalent)

10.1 Are the Organic Analysis reporting forms present with required header information on each page, for each of the following:

a. Samples and/or fractions as appropriate	[✓]	___	___
b. Matrix spikes and matrix spike duplicates	[✓]	___	___
c. Blanks	[✓]	___	___
d. Laboratory Control Samples	[✓]	___	___

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

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

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

10.3 Is chromatographic performance acceptable with respect to:

Baseline stability?	[✓]	___	___

	YES	NO	N/A
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___

Other:_____

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

10.4 Are the lab-generated standard mass spectra of identified volatile compounds present for each sample? [✓] ___ ___

ACTION: If any mass spectra are missing, take action specified in 3.2 above. If the lab does not generate their own standard spectra, make a note in the Data Assessment. If spectra are missing, contact the lab for missing spectra.

10.5 Is the RRT of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration? [✓] ___ ___

10.6 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum? [✓] ___ ___

10.7 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum? [✓] ___ ___

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected ("R"), flagged ("N") - Presumptive evidence of the presence of the compound) or changed to non detected ("U") at the calculated detection limit. In order to be

YES NO N/A

positively identified, the data must comply with the criteria listed in 9.6, 9.7, and 9.8.

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

11.0 Tentatively Identified Compounds (TIC) (CLP Form I/TIC Equivalent)

N/A Not reported

11.1 If Tentatively Identified Compound were required for this project, are all Tentatively Identified Compound reporting forms present; and do listed TICs include scan number or retention time, estimated concentration and a qualifier? [ ] ___ ___

NOTE: Add "N" qualifier to all TICs which have CAS number, if missing.

NOTE: Have the project officer/appropriate official check the project plan to determine if lab was required to identify non-target analytes (SW-846, page 8260B-23, Sect. 7.6.2).

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

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

b. Blanks [ ] ___ ___

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

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

NOTE: If TICs are present in the associated blanks take action as specified in section 3.2 above.

YES NO N/A

11.3 Are any priority pollutants listed as TIC compounds (i.e., an BNA compound listed as a VOA TIC)? [ ] ___ ✓

ACTION: 1. Flag with "R" any target compound listed as a TIC.

2. Make sure all rejected compounds are properly reported if they are target compounds.

11.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum? [ ] ___ ✓

11.5 Do TIC and "best match" standard relative ion intensities agree within ± 20%? [ ] ___ ✓

ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change the identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate. Also, when a compound is not found in any blank, but is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable, "R". (Common lab contaminants: CO_2(M/E 44), Siloxanes (M/E 73), Hexane, Aldol Condensation Products, Solvent Preservatives, and related byproducts).

12.0 Compound Quantitation and Reported Detection Limits

12.1 Are there any transcription/calculation errors in organic analysis reporting form results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and average initial RRF/CF were used to calculate organic analysis reporting form result. Were any errors found? [ ] ✓ ___

NOTE: Structural isomers with similar mass spectra, but insufficient GC resolution (i.e. percent valley between the two peaks > 25%) should be

YES NO N/A

reported as isomeric pairs. The reviewer should check the raw data to ensure that all such isomers were included in the quantitation (i.e., add the areas of the two coeluting peaks to calculate the total concentration).

12.2 Are the method CRQL's adjusted to reflect sample dilutions and, for soils, sample moisture? [✓] ___ ___

ACTION: If errors are large, take action as specified in section 3.2 above.

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

13.0 Standards Data (GC/MS)

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

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

14.0 GC/MS Initial Calibration (CLP Form VI Equivalent)

	YES	NO	N/A
14.1 Are the Initial Calibration reporting forms present and complete for the volatile fraction?	[✓]	___	___

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

ACTION: If the percent relative standard deviation (% RSD) is > ~~20~~ 15%, (8000C-39) qualify positive results for that analyte "J". When % RSD > 90%,. Qualify all positive results for that analyte "J" and all non-detects results for that analyte "R".

14.2 Are all average RRFs > 0.050?	[✓]	___	___

NOTE: (Method Requirement) For SPCC compounds, the individual RRF values must be ≥ the values in the following list. If individual RRF values reported are below the listed values document in the Data Assessment.

Chloromethane	0.10
1,1-Dichloroethane	0.10
Bromoform	0.10
Chlorobenzene	0.30
1,1,2,2-Tetrachloroethane	0.30

ACTION: Circle all outliers with red pencil.

ACTION: For any target analyte with average RRF < 0.05, or for the requirements for the 5 compounds in 14.2 above, qualify all positive results for that analyte "J" and all non-detect results for that analyte "R".

14.3 Are response factors stable over the concentration range of the calibration.	[✓]	___	___

NOTE: (Method Requirement) For the following CCC compounds, the %RSD values must be ≤ 30.0%. If %RSD values reported are > 30.0% document in the Data Assessment.

YES NO N/A

1,1-Dichloroethene
Chloroform
1,2-Dichloropropane
Toluene
Ethylbenzene
Vinyl chloride

ACTION: Circle all outliers with a red pencil.

ACTION: If the % RSD is > 20.0%, or > 30% for the 6 compounds in 14.3 above, qualify positive results for that analyte "J" and non-detects using professional judgement. When RSD > 90%, qualify all positive results for that analyte "J" and all non-detect results for that analyte "R".

NOTE: The above data qualification action applies regardless of method requirements.

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

14.4 Was the % RSD determined using RRF or CF? [✓] ___ ___

If no, what method was used to determine the linearity of the initial calibration? Document any effects to the case in the Data Assessment.

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

ACTION: Circle errors with a red pencil.

ACTION: If errors are large, take action as specified in section 3.2 above.

15.0 <u>GC/MS Calibration Verification (CLP Form VII Equivalent)</u>

YES NO N/A

15.1 Are the Calibration Verification reporting forms present and complete for all compounds of interest? [✓] ___ ___

15.2 Has a calibration verification standard been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

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

_____

ACTION: If any forms are missing or no calibration verification standard has been analyzed twelve hours prior to sample analysis, take action as specified in section 3.2 above. If calibration verification data are not available, flag all associated sample data as unusable ("R").

15.3 Was the % D determined from the calibration verification determined using RRF or CF? [✓] ___ ___

If no, what method was used to determine the calibration verification? Document any effects to the case in the Data Assessment.

15.4 Do any volatile compounds have a % D (difference or drift) between the initial and continuing RRF or CF which exceeds 20% (SW-846, page 8260B-19, section 7.4.5.2). [✓] ___ ___

NOTE: (Method Requirement) For the following CCC compounds, the %D values must be ≤ 20.0%. If %D values reported are > 20.0% document in the Data Assessment.

1,1-Dichloroethene
Chloroform
1,2-Dichloropropane
Toluene
Ethylbenzene
Vinyl chloride

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD4910

Instrument ID: GCMS-C Calibration Date: 08/17/10 Time: 0727

Lab File ID: C1172 Init. Calib. Date(s): 08/16/10 08/16/10

Init. Calib. Times: 1018 1251

GC Column: RTX-VMS ID: 0.18 (mm)

COMPOUND	RRF OR AMOUNT	RRF50.000 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Dichlorodifluoromethane	0.2640000	0.2311700	0.01	-12.44		AVRG
Chloromethane	0.3670000	0.3206200	0.1	-12.64		AVRG
Vinyl chloride	0.3160000	0.2583200	0.01	-18.25	20.00	AVRG
Bromomethane	0.1490000	0.1154600	0.01	-22.51		AVRG
Chloroethane	0.1280000	0.1055200	0.01	-17.56		AVRG
Trichlorofluoromethane	0.3160000	0.2940100	0.01	-6.96		AVRG
1,1-Dichloroethene	0.2660000	0.2341700	0.01	-11.97	20.00	AVRG
Carbon Disulfide	1.1420000	0.9488400	0.01	-16.91		AVRG
Freon-113	0.1970000	0.1792000	0.01	-9.04		AVRG
Methylene Chloride	0.3490000	0.3034700	0.01	-13.05		AVRG
Acetone	7.1e-002	6.96e-002	0.01	-1.97		AVRG
trans-1,2-Dichloroethene	0.3170000	0.2793500	0.01	-11.88		AVRG
Methyl tert-butyl ether	0.8180000	0.7770000	0.01	-5.01		AVRG
1,1-Dichloroethane	0.5660000	0.5190300	0.1	-8.30		AVRG
cis-1,2-Dichloroethene	0.3070000	0.2754000	0.01	-10.29		AVRG
Bromochloromethane	0.1390000	0.1297500	0.01	-6.65		AVRG
Chloroform	0.5280000	0.4881600	0.01	-7.54	20.00	AVRG
Carbon Tetrachloride	0.2230000	0.2075800	0.01	-6.91		AVRG
1,1,1-Trichloroethane	0.4530000	0.4128800	0.01	-8.86		AVRG
2-Butanone	0.1060000	0.1020300	0.01	-3.74		AVRG
Benzene	0.7680000	0.7122900	0.01	-7.25		AVRG
Cyclohexane	0.5140000	0.4658600	0.01	-9.36		AVRG
1,2-Dichloroethane	0.2180000	0.2132500	0.01	-2.18		AVRG
Trichloroethene	0.1830000	0.1711400	0.01	-6.48		AVRG
1,2-Dichloropropane	0.1790000	0.1702100	0.01	-4.91	20.00	AVRG
Bromodichloromethane	0.2410000	0.2309800	0.01	-4.16		AVRG
cis-1,3-dichloropropene	0.2870000	0.2813100	0.01	-1.98		AVRG
Toluene	0.4760000	0.4426100	0.01	-7.01	20.00	AVRG
4-methyl-2-pentanone	0.1270000	0.1269600	0.01	-0.03		AVRG

CCL

assoc sample: P8IR-SB01, 0810-0810

FORM VII PEST

Bromomethane (ND) in sample

8/24/10

FORM 7B
VOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD4910

Instrument ID: GCMS-C Calibration Date: 08/17/10 Time: 0727

Lab File ID: C1172 Init. Calib. Date(s): 08/16/10 08/16/10

Init. Calib. Times: 1018 1251

GC Column: RTX-VMS ID: 0.18 (mm)

COMPOUND	RRF OR AMOUNT	RRF50.000 OR AMOUNT	MIN RRF	%D OR %DRIFT	MAX %D OR %DRIFT	CURV TYPE
Tetrachloroethene	0.1650000	0.1603400	0.01	-2.82		AVRG
trans-1,3-Dichloropropene	0.2410000	0.2384900	0.01	-1.04		AVRG
1,1,2-Trichloroethane	0.1290000	0.1255100	0.01	-2.70		AVRG
Dibromochloromethane	0.1810000	0.1757000	0.01	-2.93		AVRG
1,2-Dibromoethane	0.1460000	0.1391900	0.01	-4.66		AVRG
2-Hexanone	0.1020000	0.1011400	0.01	-0.84		AVRG
Chlorobenzene	0.5690000	0.5445400	0.3	-4.30		AVRG
Ethylbenzene	0.3110000	0.2856300	0.01	-8.16	20.00	AVRG
m+p-Xylenes	0.3870000	0.3690500	0.01	-4.64		AVRG
o-Xylene	0.3620000	0.3408500	0.01	-5.84		AVRG
Styrene	0.6030000	0.5835100	0.01	-3.23		AVRG
Bromoform	0.1240000	0.1209200	0.1	-2.48		AVRG
Isopropylbenzene	1.4080000	1.2855000	0.01	-8.70		AVRG
1,1,2,2-Tetrachloroethane	0.4150000	0.3827100	0.3	-7.78		AVRG
1,3-Dichlorobenzene	0.7970000	0.7473800	0.01	-6.22		AVRG
1,4-Dichlorobenzene	0.8530000	0.8101900	0.01	-5.02		AVRG
1,2-Dichlorobenzene	0.7420000	0.7001700	0.01	-5.64		AVRG
1,2-Dibromo-3-Chloropropane	7.9e-002	7.3e-002	0.01	-7.59		AVRG
1,2,4-Trichlorobenzene	0.5290000	0.4912000	0.01	-7.14		AVRG
1,2,3-Trichlorobenzene	0.4970000	0.4564800	0.01	-8.15		AVRG
Methyl Acetate	0.1900000	0.1671700	0.01	-12.02		AVRG
Methylcyclohexane	0.5510000	0.5138200	0.01	-6.75		AVRG
Dibromofluoromethane	0.2770000	0.2599300	0.01	-6.16		AVRG
1,2-Dichloroethane-D4	0.3160000	0.3022200	0.01	-4.36		AVRG
Toluene-D8	0.6450000	0.6130400	0.01	-4.96		AVRG
P-Bromofluorobenzene	0.2600000	0.2478000	0.01	-4.69		AVRG

FORM VII PEST

10/28/10

YES NO N/A

ACTION: Circle all outliers with a red pencil.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated, "J". When %D is above 90%, qualify all positive results for that analyte "J" and all non-detect results for that analyte "R".

NOTE: The above data qualification action applies regardless of method requirements.

15.5 Do any volatile compounds have a RRF < 0.05? [ ] [✓] ___

NOTE: (Method Requirement) For SPCC compounds, the individual RRF values must be ≥ the values in the following list for each calibration verification. If average RRF values reported are below the listed values document in the data assessment.

Chloromethane	0.10
1,1-Dichloroethane	0.10
Bromoform	0.10
Chlorobenzene	0.30
1,1,2,2-Tetrachloroethane	0.30

ACTION: Circle all outliers with a red pencil.

ACTION: If RRF < 0.05, or < the requirements for the 5 compounds is section 15.5 above, qualify all positive results for that analyte "J" and all non-detect results for that analyte "R".

NOTE: The above data qualification action applies regardless of method requirements.

16.0 Internal Standards (CLP Form VIII Equivalent)

16.1 Are the internal standard (IS) areas on the internal standard reporting forms of every sample and blank within the upper and lower limits (-50% to + 100%) for each initial mid-point calibration (SW-846, 8260B-20, Sect. 7.4.7)? [✓] ___ ___

YES NO N/A

ACTION: If errors are large or information is missing, take action as specified in section 3.2 above.

ACTION: List each outlying internal standard below.

Sample ID	IS #	Area Lower Limit	Area Upper Limit
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(Attach additional sheets if necessary.)

ACTION:

1. If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results quantitated with this internal standard.

2. Do not qualify non-detects when the associated IS are counts area > + 100%.

3. If the IS area is below the lower limit (< -50%), qualify all associated non-detects (U-values) "J".

4. If extremely low area counts are reported (< -25%) or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable "R" and positive results as estimated "J".

16.2 Are the retention times of all internal standards within 30 seconds of the associated initial mid-point calibration standard (SW-846, 8260B-20, Sect. 7.4.6)? [✓] ___ ___

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

YES NO N/A

17.0 Field Duplicates

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

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 Data Assessment. However, if large differences exist, take action specified in section 3.2 above.

SEMIVOLATILE DATA VALIDATION SUMMARY

Site Name:	Vieques CTO-111	Laboratory:	Katahdin
Project Number:	617.90.01	Case/Order No.	SD4910
Sampling Date(s):	8/10, 8/11/2010		

SCAN & SIM

Compound List: ☐ TCL ☐ Priority Pollutant ☐ Appendix IX ☐ Other _____

Method: ☐ CLP SOW ☐ 40 CFR 136 ☐ SW-846 Method 8270C ☐ Other _____

The following table indicates the data validation criteria examined, any problems identified, and the QA action applied.

Data Validation Criteria:	Accept	FYI	Qualify	Comments
Holding Times	✓			
GC/MS Tuning	✓			
Initial Calibrations	✓			
Continuing Calibrations			✓	Benzaldehyde (R) in some samples for 9/8 diff (>90%)
Blank Analysis Results			✓	bis(2ethylhexyl) phalate u in all samples
System Monitoring/Surrogate Results	✓			
MS/MSD Results	✓			
Field Duplicate Results	✓			
Internal Standard Areas/RT	✓			
Target Compound Identification	✓			
TIC Identification NA				
Quantitation/Detection Limits	✓			
System Performance	✓			
Overall Assessment of Data	✓			
Other LCS	✓			

General Comments:

Accept – No qualification required.
FYI – For your information only, no qualification necessary
Qualify – Qualify as rejected, estimated or biased
NA – Not applicable.
NR – Not reviewed.

QA Scientist CL
Date 10/29/10

Revised 12/11/2000

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

Prepared by: George Karras Date: 8/20/08
George Karras, Chemist
Hazardous Waste Support Section

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

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

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

Annual Review

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

Reviewed by: _____ Date: _____
Name

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YES NO N/A

INTRODUCTION

Scope and Applicability

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

Summary of Method

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

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

Reviewer Qualifications

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

YES NO N/A

DEFINITIONS

Acronyms

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

YES NO N/A

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

Data Qualifiers

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

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

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

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

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

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

LAB QUALIFIERS:

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

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

YES NO N/A

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

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

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

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ LAB: Katahdin

SITE NAME: Vieques CTO-111

1.0 Data Completeness and Deliverables

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

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

2.0 Cover Letter, SDG Narrative

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

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

	YES	NO	N/A

II. SEMIVOLATILE ANALYSES

1.0 Traffic Reports and Laboratory Narrative

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

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

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

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

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

2.0 Holding Times

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

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

Sample_Name	Lab_Sample_ID	DateTime_	Extraction_	Analysis_D	EHT	AHT	Analytical_Method	SDG
VEPQIR-EB01-081010	SD4910-2	8/10/2010	8/16/2010	8/18/2010	6	2	8270C	SD4910
VEPQIR-SS02-0304-0810	SD4910-3	8/10/2010	8/19/2010	8/27/2010	9	8	8270C	SD4910
VEPQIR-SB02-0709-0810	SD4910-4	8/10/2010	8/19/2010	8/27/2010	9	8	8270C	SD4910
VEPQIR-SB02P-0709-0810	SD4910-5	8/10/2010	8/19/2010	8/28/2010	9	9	8270C	SD4910
VEPQIR-EB01-081110	SD4910-7	8/11/2010	8/16/2010	8/18/2010	5	2	8270C	SD4910
VEPQIR-SS01-0405-0810	SD4910-8	8/11/2010	8/19/2010	8/30/2010	8	11	8270C	SD4910
VEPQIR-SB01-0810-0810	SD4910-9	8/11/2010	8/19/2010	8/30/2010	8	11	8270C	SD4910
VEPQIR-EB01-081010	SD4910-2	8/10/2010	8/16/2010	8/30/2010	6	14	8270C_SIM	SD4910
VEPQIR-SS02-0304-0810	SD4910-3	8/10/2010	8/19/2010	8/31/2010	9	12	8270C_SIM	SD4910
VEPQIR-SB02-0709-0810	SD4910-4	8/10/2010	8/19/2010	8/31/2010	9	12	8270C_SIM	SD4910
VEPQIR-SB02P-0709-0810	SD4910-5	8/10/2010	8/19/2010	8/31/2010	9	12	8270C_SIM	SD4910
VEPQIR-EB01-081110	SD4910-7	8/11/2010	8/16/2010	8/30/2010	5	14	8270C_SIM	SD4910
VEPQIR-SS01-0405-0810	SD4910-8	8/11/2010	8/19/2010	8/31/2010	8	12	8270C_SIM	SD4910
VEPQIR-SB01-0810-0810	SD4910-9	8/11/2010	8/19/2010	8/31/2010	8	12	8270C_SIM	SD4910

10/26/10

YES NO N/A

40 days of the date of extraction.

Table of Holding Time Violations

Sample ID	Sample Matrix	Date Sampled	Date Lab Received	Date Extracted (See Traffic Report)	Date Analyzed

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

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

	YES	NO	N/A
3.0 Surrogate Recovery (Form II/Equivalent)			
3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[✓]	___	___
3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[✓]	___	___
ACTION: If CLP deliverables are unavailable, document the effect(s) in data assessments. In some cases the lab may have to be contacted to obtain the data necessary to complete the validation.			
3.3 Were outliers marked correctly with an asterisk?	[✓]	___	___
ACTION: Circle all outliers in red.			
3.4 Were two or more base neutral OR acid surrogate recoveries out of specification for any sample or method blank (Reviewer should use lab in house recovery limits. Use surrogate recovery limits from USEPA National Functional Guidlines January 2005 page 130, if in house limits are not available. See Method 8000B-43 or 80000C-24).	[✓]	___	___
Note: Examine lab in house limits for reasonableness.			
If yes, were samples re-analyzed?	[ ]	[✓]	___

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

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

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

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

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

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

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

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

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

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

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

SCAN

FORM 2
SOIL SEMIVOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD4910

Level:(low/med) LOW

	CLIENT SAMPLE ID	LAB SAMPLE ID	S1 2FP#	S2 PHL#	S3 NBZ#	S4 FBP#	S5 TBP#	S6 TPH#	S7 #	S8 #	TOT OUT
01	WG81150-BLANK	WG81150-1	65	72	69	73	67	102			0
02	WG81150-LCS	WG81150-2	72	76	74	78	85	107			0
03	WG81150-LCSD	WG81150-3	72	76	75	78	82	111			0
04	PQIR-SS02-0304-0810	SD4910-3	90*	97*	87*	91*	81	100			4 (1)
05	PQIR-SB02-0709-0810	SD4910-4	74	83*	74	74	60	85			1
06	QIR-SS02P-0709-0810	SD4910-5	79	87*	77	78	70	95			1
07	R-SS01-0405-0810	SD4910-8	77	87*	75	74	76	84			1
08	R-SS01-0405-0810MS	WG81150-4	75	79	75	75	76	100			0
09	R-SS01-0405-0810MSD	WG81150-5	84*	88*	81	77	81	103			2 - QC only
10	PQIR-SB01-0810-0810	SD4910-9	79	90*	78	80	75	85			1
11											
12											
13											
14											
15											
16											
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18											
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21											
22											
23											
24											
25											
26											
27											
28											

		QC LIMITS
S1 (2FP)	= 2-Fluorophenol	(19- 81)
S2 (PHL)	= Phenol-D6	(25- 82)
S3 (NBZ)	= Nitrobenzene-D5	(24- 81)
S4 (FBP)	= 2-Fluorobiphenyl	(29- 83)
S5 (TBP)	= 2,4,6-Tribromophenol	(16-103)
S6 (TPH)	= Terphenyl-D14	(24-136)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

FORM II SV-2

(1) No qual necessary; ND on sample
CR 10/29/10

YES NO N/A

effect in data assessments.

4.0 Matrix Spikes (Form III/Equivalent)

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

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

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

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

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

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

a. Low Water [ ] ___ [✓]

b. Low Solid [✓] ___ ___

c. Med Solid [ ] ___ [✓]

YES NO N/A

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

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

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

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

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

Water NA

____ out of ____

Solids

6 out of 134

Katahdin
ANALYTICAL SERVICES

Cert No E87604

MS/MSD Recovery Report

MS ID: WG81150-4
MSD ID: WG81150-5
Sample ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project:
SDG: SD4910

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150
Report Date: 04-SEP-10

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 84.

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
Phenol	3890	3820	ug/Kgdrywt	U280	2800	3200	72.5	83.1	12	50	56-108
Bis(2-Chloroethyl) Ether	1940	1910	ug/Kgdrywt	U280	1600	1800	81.8	91.7	10	50	50-104
2-Chlorophenol	3890	3820	ug/Kgdrywt	U280	2800	3000	70.7	77.8	8	50	57-102
2-Methylphenol	3890	3820	ug/Kgdrywt	U280	2700	3000	70.2	77.6	8	50	60-99
Bis(2-Chloroisopropyl)Ether	1940	1910	ug/Kgdrywt	U280	1600	1700	80.7	90.2	9	50	61-98
N-Nitroso-Di-N-Propylamine	1940	1910	ug/Kgdrywt	U280	1600	1700	81.2	88.1	6	50	52-93
Nitrobenzene	1940	1910	ug/Kgdrywt	U280	1500	1700	79.2	87.0	8	50	59-103
Isophorone	1940	1910	ug/Kgdrywt	U280	1600	1600	80.7	86.5	5	50	23-110
2-Nitrophenol	3890	3820	ug/Kgdrywt	U280	2700	2900	69.9	75.8	6	50	61-100
2,4-Dimethylphenol	3890	3820	ug/Kgdrywt	U280	2600	2900	67.9	75.2	8	50	52-99
Bis(2-Chloroethoxy) Methane	1940	1910	ug/Kgdrywt	U280	1600	1700	84.8	90.2	4	50	63-99
2,4-Dichlorophenol	3890	3820	ug/Kgdrywt	U280	2800	2900	73.0	77.1	3	50	63-102
4-Chloroaniline	1940	1910	ug/Kgdrywt	U280	1100	1000	57.6	52.9	10	50	10-89
Hexachlorobutadiene	1940	1910	ug/Kgdrywt	U280	1200	1400	63.2	71.8	11	50	59-90
4-Chloro-3-Methylphenol	3890	3820	ug/Kgdrywt	U280	3200	3400	83.0	89.1	5	50	62-109
Hexachlorocyclopentadiene	1940	1910	ug/Kgdrywt	U280	880	860	45.5	45.3	2	50	23-107
2,4,6-Trichlorophenol	3890	3820	ug/Kgdrywt	U280	2900	3000	75.6	77.3	0	50	61-105
2,4,5-Trichlorophenol	3890	3820	ug/Kgdrywt	U700	3300	3300	84.8	86.5	0	50	64-107
2-Nitroaniline	1940	1910	ug/Kgdrywt	U700	1900	1900	95.6	99.1	2	50	58-120
Dimethyl Phthalate	1940	1910	ug/Kgdrywt	U280	1600	1700	84.8	87.0	1	50	66-121
2,6-Dinitrotoluene	1940	1910	ug/Kgdrywt	U280	1700	1700	87.4	91.2	2	50	64-109
3-Nitroaniline	1940	1910	ug/Kgdrywt	U700	1400	1400	69.4	70.8	0	50	10-173
2,4-Dinitrophenol	3890	3820	ug/Kgdrywt	U700	2100	2500	53.0	64.7	18	50	20-81
4-Nitrophenol	3890	3820	ug/Kgdrywt	U700	4400	4700	114.	124.	6	50	45-139
Dibenzofuran	1940	1910	ug/Kgdrywt	U280	1400	1500	73.0	77.6	4	50	60-108
2,4-Dinitrotoluene	1940	1910	ug/Kgdrywt	U280	1700	1800	86.4	93.3	6	50	64-111
Diethylphthalate	1940	1910	ug/Kgdrywt	U280	1600	1600	81.8	86.0	3	50	59-113
4-Chlorophenyl-Phenylether	1940	1910	ug/Kgdrywt	U280	1700	1800	86.9	91.7	3	50	67-110
4-Nitroaniline	1940	1910	ug/Kgdrywt	U700	1700	1800	88.9	96.5	6	50	40-142
4,6-Dinitro-2-Methylphenol	3890	3820	ug/Kgdrywt	U700	2500	2800	65.3	73.4	10	50	40-111
N-Nitrosodiphenylamine/DPA	1940	1910	ug/Kgdrywt	U280	1400	1500	74.6	77.6	2	50	12-145
4-Bromophenyl-Phenylether	1940	1910	ug/Kgdrywt	U280	1700	1700	87.4	90.7	2	50	67-119
Butylbenzylphthalate	1940	1910	ug/Kgdrywt	U280	1700	1700	86.9	89.6	1	50	50-131
3,3'-Dichlorobenzidine	1940	1910	ug/Kgdrywt	U280	1000	1100	53.0	56.1	4	50	10-130

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ANALYTICAL SERVICES

Cert No E87604

MS/MSD Recovery Report

MS ID: WG81150-4
MSD ID: WG81150-5
Sample ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project:
SDG: SD4910

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150
Report Date: 04-SEP-10

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 8270C
Matrix: SL
% Solids: 84.

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
Di-N-Octylphthalate	1940	1910	ug/Kgdrywt	U280	1700	1700	89.5	88.6	3	50	10-187
Acetophenone	1940	1910	ug/Kgdrywt	U280	1600	1700	82.3	87.0	4	50	59-102
1,2,4,5-Tetrachlorobenzene	1940	1910	ug/Kgdrywt	U280	1200	1200	62.2	64.5	2	50	30-150
2,3,4,6-Tetrachlorophenol	3890	3820	ug/Kgdrywt	U280	2900	3000	74.3	79.2	4	50	58-93
Benzaldehyde	1940	1910	ug/Kgdrywt	U280	4600	8300	234.*	434.*	58*	50	10-123
3&4-Methylphenol	3890	3820	ug/Kgdrywt	U280	2900	3200	74.0	82.8	9	50	58-105
Caprolactam	1940	1910	ug/Kgdrywt	U280	1200	1400	63.8	70.8	8	50	30-140
1,1'-Biphenyl	1940	1910	ug/Kgdrywt	U280	1400	1400	70.4	73.9	3	50	50-113
Atrazine	1940	1910	ug/Kgdrywt	U280	2200	2300	114.	121.	4	50	55-135
2-Fluorophenol							74.8	83.5			43-99
Phenol-d6							79.4	87.4			53-98
Nitrobenzene-d5							75.2	80.6			47-100
2-Fluorobiphenyl							75.2	77.5			49-114
2,4,6-Tribromophenol							76.3	81.4			44-111
Terphenyl-d14							100.	103.			58-140

No action on MS/MSD

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ANALYTICAL SERVICES

Cert No E87604

MS/MSD Recovery Report

MS ID: WG81151-4
MSD ID: WG81151-5
Sample ID: SD4910-8
Client ID: PQIR-SS01-0405-0810
Project:
SDG: SD4910

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151
Report Date: 08-SEP-10

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 84.

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
Naphthalene	74.9	72.6	ug/Kg	U11.	99.	100	133.*	145.*	5	50	40-100
2-Methylnaphthalene	74.9	72.6	ug/Kg	U11.	120	120	158.*	167.*	2	50	40-100
Acenaphthylene	74.9	72.6	ug/Kg	U11.	57.	56.	75.9	77.6	1	50	40-100
Acenaphthene	74.9	72.6	ug/Kg	U11.	57.	56.	76.3	76.9	2	50	40-100
Fluorene	74.9	72.6	ug/Kg	U11.	68.	67.	91.1	92.2	2	50	40-100
Phenanthrene	74.9	72.6	ug/Kg	U11.	61.	60.	81.1	82.7	1	50	40-100
Anthracene	74.9	72.6	ug/Kg	U11.	59.	58.	78.5	80.2	1	50	40-100
Fluoranthene	74.9	72.6	ug/Kg	U11.	68.	63.	91.2	86.7	8	50	40-100
Pyrene	74.9	72.6	ug/Kg	U11.	64.	63.	86.2	86.2	3	50	40-100
Benzo (a) anthracene	74.9	72.6	ug/Kg	U11.	65.	64.	86.4	88.0	1	50	40-100
Chrysene	74.9	72.6	ug/Kg	U11.	61.	60.	82.0	83.4	1	50	40-100
Benzo (b) Fluoranthene	74.9	72.6	ug/Kg	U11.	58.	60.	78.0	83.1	3	50	40-100
Benzo(k)fluoranthene	74.9	72.6	ug/Kg	U11.	58.	57.	77.2	78.2	2	50	40-100
Benzo(a)pyrene	74.9	72.6	ug/Kg	U11.	65.	64.	86.6	88.4	1	50	40-100
Indeno (1,2,3-cd) pyrene	74.9	72.6	ug/Kg	J11.	62.	58.	68.1	65.7	5	50	40-100
Dibenzo (a,h) anthracene	74.9	72.6	ug/Kg	J7.7	67.	63.	79.6	76.7	6	50	40-100
Benzo(g,h,i)perylene	74.9	72.6	ug/Kg	U11.	49.	46.	65.4	63.4	6	50	40-100
1,4-Dioxane	74.9	72.6	ug/Kg	U57.	38.	33.	50.8	45.3	14	50	30-150
Hexachloroethane	74.9	72.6	ug/Kg	U11.	39.	43.	52.2	59.8	10	50	30-150
2-Chloronaphthalene	74.9	72.6	ug/Kg	U11.	47.	46.	62.4	63.9	1	50	30-150
Hexachlorobenzene	74.9	72.6	ug/Kg	U11.	53.	54.	71.3	74.1	1	50	30-150
Pentachlorophenol	150.	145.	ug/Kg	U57.	85.	120	57.0	84.7	36	50	30-150
Carbazole	74.9	72.6	ug/Kg	U11.	71.	69.	94.7	95.1	3	50	30-150
Di-n-butylphthalate	74.9	72.6	ug/Kg	U57.	75.	75.	100.	103.	1	50	30-150
Bis(2-ethylhexyl)phthalate	74.9	72.6	ug/Kg	JB39.	110	140	97.2	143.	24	50	30-150
2-Methylnaphthalene-D10							49.0	51.0			19-94
Fluorene-D10							62.2	62.2			20-96
Pyrene-D10							82.6	87.2			31-128
2,4-Dibromophenol							74.7	78.6			20-116

No action on MS/MSD

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YES NO N/A

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

Water NA

____ out of ____

Solids

1 out of 68

ACTION: Circle all outliers with red pencil.

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

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

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

5.0 Blanks (Form IV/Equivalent)

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

5.2 Frequency of Analysis:

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

5.3 Has a method blank been analyzed either after

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

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

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

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

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

6.0 Contamination

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

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

YES NO N/A

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

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

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

YES NO N/A

Blank Action for Semivolatile Analyses

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

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

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

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

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

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

Environmental Data Quality, Inc.

BLANK ANALYSIS RESULTS FOR TARGET ORGANIC COMPOUNDS

SVOA SIM

Date / Time	Fraction V	Fraction SV	Fraction P	MATRIX Aqu.	MATRIX Solid	BLANK TYPE TB	BLANK TYPE MB	BLANK TYPE EB	BLANK TYPE FB	Sample I.D. Number	Assoc. Samples	Contaminant	Conc. µg/L	Conc. µg/Kg	Qualification Limit 5X	Qualification Limit 10X
8/30/10		✓			✓		✓			WG-81151	all	bis(2-ethylhexyl) phthalate		66		
8/30/10		✓		✓				✓		EB01-081010	1	bis(2-ethylhexyl) phthalate	5.0	167		
8/30/10		✓		✓				✓		EB01-081110	2	bis(2-ethylhexyl) phthalate	3.7	123		

Notes: ① -3, 4, 5

② -8, 9

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

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

7.0 GC/MS Apparatus and Materials

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

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

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

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

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

	YES	NO	N/A
page 8270D-12).			
8.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift?	[✓]	___	___
8.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

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

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

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

8.4 Have the ion abundances been normalized to m/z 198?	[✓]	___	___
8.5 Have the ion abundance criteria been met for each instrument used?	[✓]	___	___

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

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

	YES	NO	N/A
ACTION: If data suggests that extract cleanup was not performed, use professional judgement. Make note in the data assessment narrative.			
9.3 Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	___	___
c. Blanks	[✓]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
9.4 Are the response factors shown in the Quant Report?	[ ]	✓	___
9.5 Is chromatographic performance acceptable with respect to:			
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[✓]	___	___
Full-scale graph (attenuation)?	[✓]	___	___
Other:_____	[ ]	___	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
9.6 Are the lab-generated standard mass spectra of identified semivolatile compounds present for			

	YES	NO	N/A
each sample?	[✓]	___	___

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

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

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

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

	YES	NO	N/A

10.0 Tentatively Identified Compounds (TIC)

N/A- not reported

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

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

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

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

b. Blanks [ ] ___ ___

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

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

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

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

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

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

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

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

11.0 Compound Quantitation and Reported Detection Limits

	YES	NO	N/A
11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	[✓]	___

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

	YES	NO	N/A
11.2 Are the method detection limits adjusted to reflect sample dilutions and, for soils, sample moisture?	[✓]	___	___

YES NO N/A

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

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

12.0 Standards Data (GC/MS)

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

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

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

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

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

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

YES NO N/A

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

ACTION: Circle all outliers in red.

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

1. "R" all non-detects;

2. "J" all positive results.

13.3 Are response factors for base neutral or acid target analytes stable over the concentration range of the calibration (% Relative standard deviation [%RSD] < ~~20.0%~~ 15? [✓] ___ ___

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

CALIBRATION CHECK COMPOUNDS

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

YES NO N/A

Benzo(a)pyrene

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

ACTION: Circle all outliers in red.

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

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

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

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

ACTION: Circle Errors in red.

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

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

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO-111 NTR VIEQUES SDG No.: SD4910

Instrument ID: GCMS-U Calibration Date(s): 08/18/10 08/18/10

Column: ZB5-MS ID: 0.25 (mm) Calibration Time(s): 1043 1425

LAB FILE ID: RF10: U2508 RF25: U2509 RF50: U2507
RF75: U2510 RF100: U2511 RF125: U2512

COMPOUND	RF10	RF25	RF50	RF75	RF100	RF125	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2	MAX %RSD OR R^2
Phenol	1.424	1.302	1.284	1.358	1.345	1.197	AVRG		1.31831069		5.842	30.000
Bis(2-Chloroethyl)ether	1.024	1.079	1.020	0.987	0.979	0.887	AVRG		0.99613443		6.419	15.000
2-Chlorophenol	1.240	1.241	1.158	1.121	1.080	0.983	AVRG		1.13704817		8.732	15.000
2-Methylphenol	1.088	1.058	1.045	1.048	1.068	1.002	AVRG		1.05135432		2.740	15.000
Bis(2-Chloroisopropyl)eth	1.560	1.548	1.543	1.479	1.430	1.303	AVRG		1.47730691		6.691	15.000
N-Nitroso-di-n-propylamin	0.821	0.790	0.730	0.694	0.655	0.621	AVRG		0.71835079		10.753	15.000
3&4-Methylphenol	1.077	1.119	1.054	1.024	0.979	0.890	AVRG		1.02393419		7.917	15.000
Nitrobenzene	0.321	0.334	0.307	0.277	0.280	0.266	AVRG		0.29737083		9.158	15.000
Isophorone	0.607	0.602	0.552	0.521	0.518	0.491	AVRG		0.54854076		8.656	15.000
2-Nitrophenol	0.188	0.195	0.185	0.172	0.171	0.164	AVRG		0.17928223		6.789	30.000
2,4-Dimethylphenol	0.329	0.330	0.298	0.277	0.274	0.250	AVRG		0.29317496		11.019	15.000
Bis(2-Chloroethoxy)methan	0.366	0.364	0.327	0.300	0.297	0.285	AVRG		0.32284596		10.905	15.000
2,4-Dichlorophenol	0.271	0.284	0.263	0.245	0.238	0.212	AVRG		0.25223812		10.340	30.000
4-Chloroaniline	273340	663800	1189200	1503200	1905400	2288400	2ORDR	-7.43e-003	2.32065840	2.98573312	0.99817	0.99000
Hexachlorobutadiene	0.184	0.186	0.164	0.149	0.143	0.129	AVRG		0.15918180		14.397	30.000
4-Chloro-3-Methylphenol	0.278	0.271	0.248	0.226	0.209	0.193	AVRG		0.23741620		14.364	30.000
Hexachlorocyclopentadiene	0.311	0.345	0.346	0.314	0.309	0.287	AVRG		0.31885402		7.233	15.000
1,2,4,5-Tetrachlorobenzen	222080	531820	994640	1267600	1729700	1946700	2ORDR	2.072e-002	1.42302304	1.08032196	0.99883	0.99000
2,4,6-Trichlorophenol	0.363	0.365	0.346	0.333	0.318	0.294	AVRG		0.33664402		8.093	30.000
2,4,5-Trichlorophenol	0.389	0.374	0.373	0.348	0.340	0.312	AVRG		0.35615554		7.941	15.000
2-Nitroaniline	0.262	0.280	0.282	0.270	0.260	0.245	AVRG		0.26640569		5.211	15.000
Dimethyl Phthalate	1.220	1.201	1.112	1.095	1.059	0.981	AVRG		1.11109867		8.028	15.000
2,6-Dinitrotoluene	0.288	0.290	0.261	0.261	0.240	0.217	AVRG		0.25961665		10.854	15.000
3-Nitroaniline	0.251	0.264	0.266	0.246	0.250	0.243	AVRG		0.25343316		3.701	15.000
2,4-Dinitrophenol	38969	138700	370080	496940	744690	865380	LINR	5.102e-002	5.81924042		0.99554	0.99000
Dibenzofuran	619250	1470000	2744800	3567400	4786500	5316200	2ORDR	3.115e-002	0.47332134	0.15619505	0.99741	0.99000
4-Nitrophenol	0.074	0.097	0.115	0.109	0.099	0.092	AVRG		9.776e-002		14.903	15.000
2,4-Dinitrotoluene	0.353	0.366	0.355	0.343	0.331	0.304	AVRG		0.34203232		6.461	15.000
2,3,4,6-Tetrachlorophenol	0.299	0.302	0.299	0.295	0.288	0.261	AVRG		0.29073130		5.235	15.000
Diethylphthalate	1.368	1.288	1.209	1.115	1.035	0.934	AVRG		1.15822266		13.958	15.000
4-Chlorophenyl-phenylethe	0.591	0.549	0.491	0.470	0.444	0.397	AVRG		0.49029755		14.409	15.000
4-Nitroaniline	0.234	0.251	0.262	0.243	0.244	0.240	AVRG		0.24554277		3.993	15.000
4,6-Dinitro-2-Methylpheno	0.108	0.126	0.126	0.123	0.118	0.113	AVRG		0.11885998		6.327	15.000
N-Nitrosodiphenylamine/DP	0.595	0.575	0.507	0.473	0.454	0.418	AVRG		0.50371918		13.814	15.000
4-Bromophenyl-phenylether	0.213	0.206	0.181	0.172	0.159	0.146	AVRG		0.17951772		14.580	15.000
Butylbenzylphthalate	0.661	0.661	0.638	0.634	0.612	0.580	AVRG		0.63121238		4.891	15.000
3,3'-Dichlorobenzidine	0.280	0.295	0.280	0.268	0.287	0.270	AVRG		0.27999317		3.635	15.000
Di-n-octylphthalate	1.911	1.705	1.587	1.606	1.244	1.176	AVRG		1.53796223		18.192	30.000
Acetophenone	0.448	0.432	0.398	0.378	0.384	0.362	AVRG		0.40026681		8.309	15.000
Benzaldehyde	50403	121690	237770	278270	351020	425930	2ORDR	2.494e-002	2.72893578	7.60132468	0.99811	0.99000
Caprolactam	0.096	0.098	0.095	0.096	0.099	0.093	AVRG		9.596e-002		2.234	15.000
1,1'-Biphenyl	540470	1224900	2229600	2780200	3500600	3837700	2ORDR	5.85e-002	0.30661851	0.44345441	0.99451	0.99000
Atrazine	0.174	0.167	0.130	0.116	0.090	0.073	AVRG		0.12491659		32.473	15.000 <-(1)

ASSOC samples: ALL

FORM VI SV

(1) ND in all samples; no qual necessary CR 10/29/10

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO-111 NTR VIEQUES SDG No.: SD4910

Instrument ID: GCMS-G Calibration Date(s): 08/30/10 08/30/10

Column: ZB5-MS ID: 0.25 (mm) Calibration Time(s): 1453 1826

LAB FILE ID: RF0.2: G9233 RF0.5: G9232 RF1: G9228
RF2: G9231 RF5: G9230 RF8: G9229

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2	MAX %RSD OR R^2
Naphthalene	0.717	0.697	0.700	0.698	0.714	0.622	AVRG		0.69160978		5.046	15.000
2-Methylnaphthalene	0.384	0.366	0.382	0.329	0.326	0.351	AVRG		0.35626850		7.111	15.000
Acenaphthylene	1.506	1.609	1.663	1.657	1.606	1.552	AVRG		1.59882133		3.811	15.000
Acenaphthene	1.008	1.034	1.049	1.049	0.985	0.951	AVRG		1.01261312		3.870	15.000
Fluorene	0.920	0.934	1.023	1.006	1.086	1.145	AVRG		1.01902222		8.491	15.000
Phenanthrene	1.034	1.063	1.001	1.007	0.971	0.892	AVRG		0.99468599		5.940	15.000
Anthracene	0.822	0.936	0.872	0.870	0.840	0.780	AVRG		0.85339923		6.222	15.000
Fluoranthene	0.758	0.811	0.832	0.819	0.881	0.873	AVRG		0.82909579		5.408	15.000
Pyrene	1.554	1.936	1.690	1.749	1.658	1.543	AVRG		1.68834912		8.589	15.000
Benzo(a)anthracene	0.867	0.915	0.996	0.926	0.975	0.943	AVRG		0.93691643		4.870	15.000
Chrysene	1.116	1.154	1.098	0.984	0.999	0.955	AVRG		1.05128562		7.768	15.000
Benzo(b)fluoranthene	1.018	1.106	1.041	1.032	1.123	1.120	AVRG		1.07345220		4.473	15.000
Benzo(k)fluoranthene	1.556	1.520	1.307	1.257	1.271	1.274	AVRG		1.36397065		9.987	15.000
Benzo(a)pyrene	0.802	0.914	0.922	0.903	0.991	1.018	AVRG		0.92530138		8.195	15.000
Indeno(1,2,3-cd)pyrene	1952	4593	16832	33024	127270	208420	LINR	0.31554312	1.25953355		0.99520	0.99000
Dibenzo(a,h)anthracene	2058	5507	17321	35678	119190	190540	LINR	0.20298602	1.38462416		0.99814	0.99000
Benzo(g,h,i)perylene	0.690	0.805	0.918	0.934	0.944	0.964	AVRG		0.87577828		12.206	15.000
Hexachloroethane	0.489	0.478	0.505	0.470	0.465	0.460	AVRG		0.47784047		3.537	15.000
2-Chloronaphthalene	0.374	0.388	0.377	0.397	0.361	0.308	AVRG		0.36770658		8.611	15.000
Hexachlorobenzene	0.304	0.291	0.264	0.268	0.256	0.252	AVRG		0.27255165		7.471	15.000
Pentachlorophenol	4846	10755	21688	26528	44165	68902	2ORDR	0.26225047	11.0060577	-1.6908897	0.99580	0.99000
Carbazole	12625	28483	57798	109230	254360	351280	2ORDR	-2.53e-002	1.25652957	0.11844306	0.99938	0.99000
Di-n-butylphthalate	1.082	1.155	1.226	1.190	1.214	1.235	AVRG		1.18380787		4.860	15.000
bis(2-Ethylhexyl)phthalat	28795	61069	127610	141530	264010	389310	2ORDR	0.24362789	1.04869786	-6.89e-003	0.99344	0.99000
1,4-Dioxane	0.352	0.259	0.331	0.479	0.451	0.179	AVRG		0.34198761		33.143	15.000 <-(1)
2-Methylnaphthalene-D10	0.938	0.998	0.895	1.041	0.886	0.807	AVRG		0.92731645		9.063	15.000
2,4-Dibromophenol	0.442	0.513	0.548	0.559	0.633	0.576	AVRG		0.54521365		11.757	15.000
Fluorene-D10	15239	34784	64045	115100	275730	377730	LINR	-0.3071067	1.12619800		0.99549	0.99000
Pyrene-D10	0.934	1.205	1.051	1.024	1.012	1.009	AVRG		1.03931087		8.659	15.000

assoc samples: All

(1) ND in samples, no qual necessary

FORM VI SV

CR 10/29/10

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

ACTION: If DDT percent breakdown exceeds 20%:

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

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

14.0 <u>GC/MS Calibration Verification (Form VII/Equivalent)</u>

14.1 Are the Calibration Verification Forms (Form VII) present and complete for all compounds of interest?	[✓]	___	___
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

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

_____

_____

_____

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

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD4910

Instrument ID: GCMS-U Calibration Date: 08/27/10 Time: 1247

Lab File ID: U2688 Init. Calib. Date(s): 08/18/10 08/18/10

Init. Calib. Times: 1043 1425

GC Column: ZB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF50.000 or AMOUNT	CCAL RRF50.000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE	
Diethylphthalate	1.1580000	1.2880000	1.2880000	0.01	11.23	20.00	AVRG	
4-Chlorophenyl-phenylether	0.4900000	0.4648000	0.4648000	0.01	-5.14	20.00	AVRG	
4-Nitroaniline	0.2460000	0.2356100	0.2356100	0.01	-4.22	20.00	AVRG	
4,6-Dinitro-2-Methylphenol	0.1190000	0.1229000	0.1229000	0.01	3.28	20.00	AVRG	
N-Nitrosodiphenylamine/DPA	0.5040000	0.5095800	0.5095800	0.01	1.11	20.00	AVRG	
4-Bromophenyl-phenylether	0.1800000	0.1777000	0.1777000	0.01	-1.28	20.00	AVRG	
Butylbenzylphthalate	0.6310000	0.6547800	0.6547800	0.01	3.77	20.00	AVRG	
3,3'-Dichlorobenzidine	0.2800000	0.2523800	0.2523800	0.01	-9.86	20.00	AVRG	
Di-n-octylphthalate	1.5380000	1.6911000	1.6911000	0.01	9.95	20.01	AVRG	
Acetophenone	0.4000000	0.3881200	0.3881200	0.01	-2.97	20.00	AVRG	
Benzaldehyde	109.46000	50.000000	0.3553200	0.01	118.92	20.00	2RDR	<-(1)
Caprolactam	9.6e-002	8.83e-002	8.83e-002	0.01	-8.02	20.00	AVRG	
1,1'-Biphenyl	44.885000	50.000000	0.9928900	0.01	-10.23	20.00	2RDR	
Atrazine	0.1250000	0.1283800	0.1283800	0.01	2.70	20.00	AVRG	
2-Fluorophenol	1.0910000	1.0945000	1.0945000	0.01	0.32	20.00	AVRG	
Phenol-D6	1.2020000	1.1476000	1.1476000	0.01	-4.52	20.00	AVRG	
Nitrobenzene-D5	0.3110000	0.3068000	0.3068000	0.01	-1.35	20.00	AVRG	
2-Fluorobiphenyl	1.0570000	0.9960300	0.9960300	0.01	-5.77	20.00	AVRG	
2,4,6-Tribromophenol	0.1990000	0.1762900	0.1762900	0.01	-11.41	20.00	AVRG	
Terphenyl-D14	0.6330000	0.7006100	0.7006100	0.01	10.68	20.00	AVRG	

assoc samples: -3, -4, -5

(1) non detects (R) in assoc samples

FORM VII PEST

10/29/10

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

YES NO N/A

ACTION: Circle errors in red.

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

15.0 Internal Standards (Form VIII)

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

ACTION: List each outlying internal standard below.

Sample ID	IS #	Area	LowerLimit	Upper Limit

(Attach additional sheets if necessary.)

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

ACTION:

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

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

	YES	NO	N/A
iii. If the IS area is below the lower limit (<50%), qualify all associated non-detects (U-values) "J". If extremely low area counts are reported (<25%) or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable (R).			
15.2 Are the retention times of all internal standards within 30 seconds of the associated calibration standard?	[✓]	___	___

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

16.0 Laboratory Control Samples (LCS)

	YES	NO	N/A
16.1 Were any LCS samples run in order to verify analytes which failed criteria for spike recovery?	[✓]	___	___
16.2 Did the lab spike LCS sample spiked with the same analytes and the same concentrations as the matrix spike?	[✓]	___	___
16.3 Were the mean and standard deviation of all analytes within the QC acceptance ranges as shown in Table 6, 8270D-43?	[ ]	✓	___

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

17.0 Field Duplicates

	YES	NO	N/A
17.1 Were any field duplicates submitted for semivolatile analysis?	[✓]	___	___

Katahdin
ANALYTICAL SERVICES

Cert No E87604

LCS/LCSD Recovery Report

LCS ID: WG81150-2
LCSD ID: WG81150-3
Project:
SDG: SD4910
Report Date: 04-SEP-10

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81150

Analysis Date: 23-AUG-10
Analyst: JLP
Analysis Method: SW846 8270C
Matrix: SL
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Acetophenone	1670	1360	81.4	1360	81.4	ug/Kgdrywt	0	50	59-102
1,2,4,5-Tetrachlorobenzene	1670	1060	63.5	1050	62.9	ug/Kgdrywt	1	50	30-150
2,3,4,6-Tetrachlorophenol	3330	2570	77.2	2580	77.5	ug/Kgdrywt	0	50	58-93
Benzaldehyde	1670	1610	96.4	2110	126.*	ug/Kgdrywt	27	50	10-123 (1)
3&4-Methylphenol	3330	2500	75.1	2540	76.3	ug/Kgdrywt	2	50	58-105
Caprolactam	1670	946.	56.6	1040	62.3	ug/Kgdrywt	9	50	30-140
1,1'-Biphenyl	1670	1250	74.8	1290	77.2	ug/Kgdrywt	3	50	50-113
Atrazine	1670	2090	125.	2160	129.	ug/Kgdrywt	3	50	55-135
2-Fluorophenol			71.8		71.6				43-99
Phenol-d6			75.6		75.8				53-98
Nitrobenzene-d5			74.3		74.6				47-100
2-Fluorobiphenyl			77.8		78.2				49-114
2,4,6-Tribromophenol			84.6		82.0				44-111
Terphenyl-d14			107.		111.				58-140

(1) ND in sample no qual necessary
OR 10/29/10

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029
http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

LCS/LCSD Recovery Report

LCS ID: WG81151-2RA
LCSD ID: WG81151-3
Project:
SDG: SD4910
Report Date: 08-SEP-10

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Naphthalene	66.7	68.8	103.*	85.2	128.*	ug/Kg	21	50	40-100 (1)
2-Methylnaphthalene	66.7	57.8	86.6	78.5	118.*	ug/Kg	30	50	40-100 (1)
Acenaphthylene	66.7	37.6	56.4	46.3	69.4	ug/Kg	21	50	40-100
Acenaphthene	66.7	41.1	61.6	49.1	73.6	ug/Kg	18	50	40-100
Fluorene	66.7	38.6	57.9	45.9	68.8	ug/Kg	17	50	40-100
Phenanthrene	66.7	47.7	71.5	56.9	85.3	ug/Kg	18	50	40-100
Anthracene	66.7	50.9	76.3	56.7	85.0	ug/Kg	11	50	40-100
Fluoranthene	66.7	57.7	86.5	62.4	93.6	ug/Kg	8	50	40-100
Pyrene	66.7	50.4	75.6	56.1	84.1	ug/Kg	11	50	40-100
Benzo (a) anthracene	66.7	54.3	81.4	57.8	86.6	ug/Kg	6	50	40-100
Chrysene	66.7	53.8	80.6	56.9	85.3	ug/Kg	6	50	40-100
Benzo (b) Fluoranthene	66.7	49.6	74.4	54.1	81.1	ug/Kg	9	50	40-100
Benzo(k)fluoranthene	66.7	46.8	70.2	50.6	75.9	ug/Kg	8	50	40-100
Benzo(a)pyrene	66.7	53.9	80.8	59.5	89.2	ug/Kg	10	50	40-100
Indeno (1,2,3-cd) pyrene	66.7	53.6	80.4	59.5	89.2	ug/Kg	10	50	40-100
Dibenzo (a,h) anthracene	66.7	56.0	84.0	63.2	94.8	ug/Kg	12	50	40-100
Benzo(g,h,i)perylene	66.7	62.6	93.8	69.4	104.*	ug/Kg	10	50	40-100
1,4-Dioxane	66.7	27.9	41.8	43.9	65.8	ug/Kg	44	50	30-150
Hexachloroethane	66.7	38.1	57.1	46.5	69.7	ug/Kg	20	50	30-150
2-Chloronaphthalene	66.7	38.8	58.2	44.8	67.2	ug/Kg	14	50	30-150
Hexachlorobenzene	66.7	41.0	61.5	48.3	72.4	ug/Kg	16	50	30-150
Pentachlorophenol	133.	51.3	38.6	64.5	48.5	ug/Kg	23	50	30-150
Carbazole	66.7	59.1	88.6	62.7	94.0	ug/Kg	6	50	30-150
Di-n-butylphthalate	66.7	70.1	105.	81.5	122.	ug/Kg	15	50	30-150
Bis(2-ethylhexyl)phthalate	66.7	211.	316.*	120.	180.*	ug/Kg	55*	50	30-150
2-Methylnaphthalene-D10			44.4		53.7				19-94
Fluorene-D10			52.8		59.6				20-96
Pyrene-D10			76.7		79.9				31-128
2,4-Dibromophenol			56.0		62.6				20-116

(1) ND in samples; No qual necessary
CR 10/29/10

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YES NO N/A

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

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

SEMIVOLATILE DATA VALIDATION SUMMARY

Site Name:	Vieques CTO-111	Laboratory:	Katahdin
Project Number:	617.90.01	Case/Order No.	SD5038
Sampling Date(s):	8/16, 8/17/2010		

SIM only

Compound List: ☑ TCL Select ☐ Priority Pollutant ☐ Appendix IX ☐ Other _____

Method: ☐ CLP SOW ☐ 40 CFR 136 ☑ SW-846 Method 8270C ☐ Other _____

The following table indicates the data validation criteria examined, any problems identified, and the QA action applied.

Data Validation Criteria:	Accept	FYI	Qualify	Comments
Holding Times	✓			
GC/MS Tuning	✓			
Initial Calibrations	✓			
Continuing Calibrations			✓	bis(2-ethylhexyl)phthalate (J) in EB01
Blank Analysis Results			✓	bis(2-ethylhexyl)phthalate (U)
System Monitoring/Surrogate Results	✓			
MS/MSD Results	✓			
Field Duplicate Results	✓			
Internal Standard Areas/RT	✓			
Target Compound Identification	✓			
TIC Identification NA				
Quantitation/Detection Limits	✓			
System Performance	✓			
Overall Assessment of Data	✓			
Other LCS	✓			

General Comments:

Accept – No qualification required.
FYI – For your information only, no qualification necessary
Qualify – Qualify as rejected, estimated or biased
NA – Not applicable.
NR – Not reviewed.

QA Scientist CR
Date 10/21/10

Revised 12/11/2000

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

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

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

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

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

Annual Review

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

Reviewed by: _____ Date: _____
Name

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YES NO N/A

INTRODUCTION

Scope and Applicability

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

Summary of Method

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

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

Reviewer Qualifications

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

YES NO N/A

DEFINITIONS

Acronyms

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

YES NO N/A

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

Data Qualifiers

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

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

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

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

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

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

LAB QUALIFIERS:

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

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

YES NO N/A

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

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

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

I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ LAB: Katahdin

SITE NAME: Vieques CTO-11

1.0 Data Completeness and Deliverables

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

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

2.0 Cover Letter, SDG Narrative

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

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

	YES	NO	N/A

II. SEMIVOLATILE ANALYSES

1.0 Traffic Reports and Laboratory Narrative

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

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

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

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

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

2.0 Holding Times

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

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

Sample_Name	Lab_Sample_ID	DateTime_	Extraction_	Analysis_D	EHT	AHT	Analytical_Method	SDG
PI07-EB01-081610	SD5038-1	8/16/2010	8/23/2010	8/31/2010	7	8	8270C_SIM	SD5038
PI07-SS42-0001-0810	SD5038-2	8/17/2010	8/19/2010	8/31/2010	2	12	8270C_SIM	SD5038
PI07-SB42-0101H-0810	SD5038-3	8/17/2010	8/19/2010	8/31/2010	2	12	8270C_SIM	SD5038
PI07-SB42P-0101H-0810	SD5038-4	8/17/2010	8/19/2010	8/31/2010	2	12	8270C_SIM	SD5038

10/31/10

YES NO N/A

40 days of the date of extraction.

Table of Holding Time Violations

Sample ID	Sample Matrix	Date Sampled	Date Lab Received	(See Traffic Report) Date Extracted	Date Analyzed

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

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

	YES	NO	N/A
3.0 Surrogate Recovery (Form II/Equivalent)			
3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[✓]	___	___
3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:			
a. Low Water	[✓]	___	___
b. Low/Med Soil	[✓]	___	___

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

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

ACTION: Circle all outliers in red.

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

Note: Examine lab in house limits for reasonableness.

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

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

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

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

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

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

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

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

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

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

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

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

YES NO N/A

effect in data assessments.

4.0 Matrix Spikes (Form III/Equivalent)

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

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

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

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

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

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

a. Low Water [ ] ___ ✓

b. Low Solid [✓] ___ ___

c. Med Solid [ ] ___ ✓

YES NO N/A

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

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

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

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

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

Water NA

____ out of ____

Solids

2 out of 50

Katahdin
ANALYTICAL SERVICES

Cert No E87604

MS/MSD Recovery Report

MS ID: WG81951-3
MSD ID: WG81951-4
Sample ID: SD5038-2
Client ID: PI07-SS42-0001-0810
Project:
SDG: SD5038

Received Date: 09-SEP-10
Extract Date: 09-SEP-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81951
Report Date: 13-SEP-10

Analysis Date: 30-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: 81.

Compound	MS Spike	MSD Spike	Conc Units	Samp Conc	MS Conc	MSD Conc	MS Rec (%)	MSD Rec (%)	RPD (%)	RPD Limit	Limits
Naphthalene	79.6	80.9	ug/Kgdrywt	U12.	77.	86.	96.3	106.*	12	50	40-100
2-Methylnaphthalene	79.6	80.9	ug/Kgdrywt	U12.	64.	64.	80.3	79.6	1	50	40-100
Acenaphthylene	79.6	80.9	ug/Kgdrywt	U12.	54.	57.	67.6	70.7	6	50	40-100
Acenaphthene	79.6	80.9	ug/Kgdrywt	U12.	58.	60.	72.4	74.6	4	50	40-100
Fluorene	79.6	80.9	ug/Kgdrywt	U12.	56.	60.	70.0	73.9	7	50	40-100
Phenanthrene	79.6	80.9	ug/Kgdrywt	U12.	68.	72.	86.1	89.2	5	50	40-100
Anthracene	79.6	80.9	ug/Kgdrywt	U12.	58.	60.	72.6	74.4	4	50	40-100
Fluoranthene	79.6	80.9	ug/Kgdrywt	U12.	60.	65.	75.2	80.2	8	50	40-100
Pyrene	79.6	80.9	ug/Kgdrywt	U12.	57.	63.	72.1	77.4	9	50	40-100
Benzo (a) anthracene	79.6	80.9	ug/Kgdrywt	U12.	62.	67.	77.3	82.7	8	50	40-100
Chrysene	79.6	80.9	ug/Kgdrywt	U12.	59.	68.	74.4	83.6	13	50	40-100
Benzo (b) Fluoranthene	79.6	80.9	ug/Kgdrywt	U12.	69.	74.	86.5	91.1	7	50	40-100
Benzo(k)fluoranthene	79.6	80.9	ug/Kgdrywt	U12.	54.	59.	67.7	73.2	9	50	40-100
Benzo(a)pyrene	79.6	80.9	ug/Kgdrywt	U12.	60.	66.	75.8	81.9	9	50	40-100
Indeno (1,2,3-cd) pyrene	79.6	80.9	ug/Kgdrywt	U12.	54.	61.	67.6	74.9	12	50	40-100
Dibenzo (a,h) anthracene	79.6	80.9	ug/Kgdrywt	U12.	52.	59.	65.6	72.7	12	50	40-100
Benzo(g,h,i)perylene	79.6	80.9	ug/Kgdrywt	U12.	43.	48.	54.4	60.0	11	50	40-100
1,4-Dioxane	79.6	80.9	ug/Kgdrywt	U58.	22.	30.	27.6*	36.6	29	50	30-150
Hexachloroethane	79.6	80.9	ug/Kgdrywt	U12.	50.	56.	62.8	69.4	11	50	30-150
2-Chloronaphthalene	79.6	80.9	ug/Kgdrywt	U12.	53.	55.	66.4	67.8	4	50	30-150
Hexachlorobenzene	79.6	80.9	ug/Kgdrywt	U12.	53.	56.	66.4	68.8	5	50	30-150
Pentachlorophenol	159.	162.	ug/Kgdrywt	U58.	170	170	104.	103.	1	50	30-150
Carbazole	79.6	80.9	ug/Kgdrywt	U12.	80.	88.	100.	109.	10	50	30-150
Di-n-butylphthalate	79.6	80.9	ug/Kgdrywt	U58.	68.	73.	86.0	90.0	6	50	30-150
Bis(2-ethylhexyl)phthalate	79.6	80.9	ug/Kgdrywt	JB47.	93.	100	57.4	65.2	7	50	30-150
2-Methylnaphthalene-D10							74.7	82.4			19-94
Fluorene-D10							58.3	62.7			20-96
Pyrene-D10							72.1	76.4			31-128
2,4-Dibromophenol							83.0	82.1			20-116

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http://www.katahdinlab.com

YES NO N/A

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

Water	Solids
____ out of ____	0 out of 25

ACTION: Circle all outliers with red pencil.

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

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

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

5.0 Blanks (Form IV/Equivalent)

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

5.2 Frequency of Analysis:

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

5.3 Has a method blank been analyzed either after

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

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

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

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

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

6.0 <u>Contamination</u>

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

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

YES NO N/A

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

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

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

Environmental Data Quality, Inc.

BLANK ANALYSIS RESULTS FOR TARGET ORGANIC COMPOUNDS

Date / Time	Fraction V	Fraction SV	Fraction P	MATRIX Aqu.	MATRIX Solid	BLANK TYPE TB	BLANK TYPE MB	BLANK TYPE EB	BLANK TYPE FB	Sample I.D. Number	Assoc. Samples	Contaminant	Conc. µg/L	Conc. µg/Kg	Qualification Limit 5X	Qualification Limit 10X
8/30/10		✓			✓		✓			WG811151	all	bis(2-ethylhexyl)phthalate		66J		
8/31/10		✓		✓				✓		E001-681610	all	bis(2-ethylhexyl)phthalate	29	97		

Notes: bis(2-ethylhexyl)phthalate (U) in all samples

CR 10/31/10

YES NO N/A

Blank Action for Semivolatile Analyses

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

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

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

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

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

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

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

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

7.0 GC/MS Apparatus and Materials

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

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

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

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

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

	YES	NO	N/A
page 8270D-12).			
8.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift?	[✓]	___	___
8.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

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

DATE	TIME	INSTRUMENT	SAMPLE NUMBERS

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

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

8.4 Have the ion abundances been normalized to m/z 198?	[✓]	___	___
8.5 Have the ion abundance criteria been met for each instrument used?	[✓]	___	___

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

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

	YES	NO	N/A
ACTION: If data suggests that extract cleanup was not performed, use professional judgement. Make note in the data assessment narrative.			
9.3 Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?			
a. Samples and/or fractions as appropriate	[✓]	___	___
b. Matrix spikes and matrix spike duplicates (Mass spectra not required)	[✓]	___	___
c. Blanks	[✓]	___	___
ACTION: If any data are missing, take action specified in 3.2 above.			
9.4 Are the response factors shown in the Quant Report?	[ ]	✓	___
9.5 Is chromatographic performance acceptable with respect to:			
Baseline stability?	[✓]	___	___
Resolution?	[✓]	___	___
Peak shape?	[ ]	___	___
Full-scale graph (attenuation)?	[✓]	___	___
Other:_____	[ ]	___	✓
ACTION: Use professional judgement to determine the acceptability of the data.			
9.6 Are the lab-generated standard mass spectra of identified semivolatile compounds present for			

	YES	NO	N/A
each sample?	[✓]	___	___

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

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

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

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

	YES	NO	N/A

10.0 Tentatively Identified Compounds (TIC) Not Reported

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

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

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

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

b. Blanks [ ] ___ ___

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

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

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

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

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

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

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

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

11.0 Compound Quantitation and Reported Detection Limits

	YES	NO	N/A
11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found?	___	[✓]	___

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

	YES	NO	N/A
11.2 Are the method detection limits adjusted to reflect sample dilutions and, for soils, sample moisture?	[✓]	___	___

YES NO N/A

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

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

12.0 Standards Data (GC/MS)

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

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

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

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

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

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

YES NO N/A

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

ACTION: Circle all outliers in red.

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

1. "R" all non-detects;

2. "J" all positive results.

13.3 Are response factors for base neutral or acid target analytes stable over the concentration range of the calibration (% Relative standard deviation [%RSD] < ~~20.0%~~ 15)? [ ] ✓ ___

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

CALIBRATION CHECK COMPOUNDS

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

	YES	NO	N/A

Benzo(a)pyrene

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

ACTION: Circle all outliers in red.

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

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

	YES	NO	N/A
13.4 Did the laboratory calculate the calibration curve by the least squares regression fit?		✓	
13.5 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or % RSD? (Check at least two values but if errors are found, check more.)		✓	

ACTION: Circle Errors in red.

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

	YES	NO	N/A
13.5 Do the target compounds for this SDG include Pesticides?		✓	

FORM 6
SEMIVOLATILE INITIAL CALIBRATION DATA

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project CTO-111 NTR VIEQUES SDG No.: SD5038

Instrument ID: GCMS-G Calibration Date(s): 08/30/10 08/30/10

Column: ZB5-MS ID: 0.25 (mm) Calibration Time(s): 1453 1826

LAB FILE ID: RF0.2: G9233 RF0.5: G9232 RF1: G9228
RF2: G9231 RF5: G9230 RF8: G9229

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF5	RF8	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2	MAX %RSD OR R^2
Naphthalene	0.717	0.697	0.700	0.698	0.714	0.622	AVRG		0.69160978		5.046	15.000
2-Methylnaphthalene	0.384	0.366	0.382	0.329	0.326	0.351	AVRG		0.35626850		7.111	15.000
Acenaphthylene	1.506	1.609	1.663	1.657	1.606	1.552	AVRG		1.59882133		3.811	15.000
Acenaphthene	1.008	1.034	1.049	1.049	0.985	0.951	AVRG		1.01261312		3.870	15.000
Fluorene	0.920	0.934	1.023	1.006	1.086	1.145	AVRG		1.01902222		8.491	15.000
Phenanthrene	1.034	1.063	1.001	1.007	0.971	0.892	AVRG		0.99468599		5.940	15.000
Anthracene	0.822	0.936	0.872	0.870	0.840	0.780	AVRG		0.85339923		6.222	15.000
Fluoranthene	0.758	0.811	0.832	0.819	0.881	0.873	AVRG		0.82909579		5.408	15.000
Pyrene	1.554	1.936	1.690	1.749	1.658	1.543	AVRG		1.68834912		8.589	15.000
Benzo(a)anthracene	0.867	0.915	0.996	0.926	0.975	0.943	AVRG		0.93691643		4.870	15.000
Chrysene	1.116	1.154	1.098	0.984	0.999	0.955	AVRG		1.05128562		7.768	15.000
Benzo(b)fluoranthene	1.018	1.106	1.041	1.032	1.123	1.120	AVRG		1.07345220		4.473	15.000
Benzo(k)fluoranthene	1.556	1.520	1.307	1.257	1.271	1.274	AVRG		1.36397065		9.987	15.000
Benzo(a)pyrene	0.802	0.914	0.922	0.903	0.991	1.018	AVRG		0.92530138		8.195	15.000
Indeno(1,2,3-cd)pyrene	1952	4592	16832	33021	127270	208420	LINR	0.31554312	1.25953355		0.99520	0.99000
Dibenzo(a,h)anthracene	2058	5507	17321	35678	119190	190540	LINR	0.20298602	1.38462416		0.99814	0.99000
Benzo(g,h,i)perylene	0.690	0.805	0.918	0.934	0.944	0.964	AVRG		0.87577828		12.206	15.000
Hexachloroethane	0.489	0.478	0.505	0.470	0.465	0.460	AVRG		0.47784047		3.537	15.000
2-Chloronaphthalene	0.374	0.388	0.377	0.397	0.361	0.308	AVRG		0.36770658		8.611	15.000
Hexachlorobenzene	0.304	0.291	0.264	0.268	0.256	0.252	AVRG		0.27255165		7.471	15.000
Pentachlorophenol	4846	10755	21688	26528	44165	68902	2ORDR	0.26225047	11.0060577	-1.6908897	0.99580	0.99000
Carbazole	12625	28483	57798	109230	254360	351280	2ORDR	-2.53e-002	1.25652957	0.11844306	0.99938	0.99000
Di-n-butylphthalate	1.082	1.155	1.226	1.190	1.214	1.235	AVRG		1.18380787		4.860	15.000
bis(2-Ethylhexyl)phthalat	28795	61069	127610	141530	264010	389310	2ORDR	0.24362789	1.04869786	-6.89e-003	0.99344	0.99000
1,4-Dioxane	0.352	0.259	0.331	0.479	0.451	0.179	AVRG		0.34198761		33.143	15.000
2-Methylnaphthalene-D10	0.938	0.998	0.895	1.041	0.886	0.807	AVRG		0.92731645		9.063	15.000
2,4-Dibromophenol	0.442	0.513	0.548	0.559	0.633	0.576	AVRG		0.54521365		11.757	15.000
Fluorene-D10	15239	34784	64045	115100	275730	377730	LINR	-0.3071067	1.12619800		0.99549	0.99000
Pyrene-D10	0.934	1.205	1.051	1.024	1.012	1.009	AVRG		1.03931087		8.659	15.000

(1) ND in samples, no qual necessary

FORM VI SV

CR 10/31/10

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

ACTION: If DDT percent breakdown exceeds 20%:

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

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

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

14.1 Are the Calibration Verification Forms (Form VII) present and complete for all compounds of interest?	[✓]	___	___
14.2 Has a calibration verification standard been analyzed for every twelve hours of sample analysis per instrument?	[✓]	___	___

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

_____

_____

_____

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

	YES	NO	N/A
call lab for explanation/resubmittal. If continuing calibration data are not available, flag all associated sample data as unusable ("R").			
14.3 Do any of the SPCCs have an RRF <0.05?	___	[✓]	___
If YES, make a note in data assessment if the lab did not take corrective action specified in section 7.4.4, page 8270D-18.	[✓]	___	✓
14.4 Do any of the CCCs have a %D between the initial and continuing RRF which exceeds 20.0%?			

ACTION: If yes, make a note in data assessment.

14.5 Do any semivolatile compounds have a % Difference (% D) between the initial and continuing RRF which exceeds 20.0%?	✓	[ ]	___

ACTION: Circle all outliers in red.

ACTION: Qualify both positive results and non-detects for the outlier compound(s) as estimated (J). When %D is above 90%, qualify all non-detects for that analyte as "R", unusable.

14.6 Do any semivolatile compounds have a RRF < 0.05?	___	[✓]	___

ACTION: Circle all outliers in red.

ACTION: If RRF < 0.05, qualify as unusable ("R") associated non-detects and "J" associated positive values.

14.7 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or percent difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more).	___	[✓]	___

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD5038

Instrument ID: GCMS-G Calibration Date: 08/31/10 Time: 0946

Lab File ID: G9252 Init. Calib. Date(s): 08/30/10 08/30/10

Init. Calib. Times: 1453 1826

GC Column: ZB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
Naphthalene	0.6910000	0.6859600	0.6859600	0.01	-0.73	100.00	AVRG
2-Methylnaphthalene	0.3560000	0.4100800	0.4100800	0.01	15.19	100.00	AVRG
Acenaphthylene	1.5990000	1.6774000	1.6774000	0.01	4.90	100.00	AVRG
Acenaphthene	1.0130000	1.0236000	1.0236000	0.01	1.05	20.00	AVRG
Fluorene	1.0190000	1.1270000	1.1270000	0.01	10.60	100.00	AVRG
Phenanthrene	0.9950000	0.9274100	0.9274100	0.01	-6.79	100.00	AVRG
Anthracene	0.8530000	0.8089600	0.8089600	0.01	-5.16	100.00	AVRG
Fluoranthene	0.8290000	0.8815700	0.8815700	0.01	6.34	20.00	AVRG
Pyrene	1.6880000	1.8988000	1.8988000	0.01	12.49	100.00	AVRG
Benzo(a)anthracene	0.9370000	0.9823500	0.9823500	0.01	4.84	100.00	AVRG
Chrysene	1.0510000	1.0784000	1.0784000	0.01	2.61	100.00	AVRG
Benzo(b)fluoranthene	1.0730000	1.0957000	1.0957000	0.01	2.12	100.00	AVRG
Benzo(k)fluoranthene	1.3640000	1.3151000	1.3151000	0.01	-3.58	100.00	AVRG
Benzo(a)pyrene	0.9250000	0.9678000	0.9678000	0.01	4.63	20.00	AVRG
Indeno(1,2,3-cd)pyrene	1.0034000	1.0000000	0.5962200	0.01	0.34	100.00	LINR
Dibenzo(a,h)anthracene	1.0925000	1.0000000	0.6717600	0.01	9.25	100.00	LINR
Benzo(g,h,i)perylene	0.8760000	0.8687300	0.8687300	0.01	-0.83	100.00	AVRG
Hexachloroethane	0.4780000	0.4955400	0.4955400	0.01	3.67	100.00	AVRG
2-Chloronaphthalene	0.3680000	0.3349600	0.3349600	0.01	-8.98	100.00	AVRG
Hexachlorobenzene	0.2720000	0.2657800	0.2657800	0.01	-2.29	100.00	AVRG
Pentachlorophenol	3.0389000	3.0000000	9.04e-002	0.01	1.30	20.00	2RDR
Carbazole	1.1229000	1.0000000	0.8288200	0.01	12.29	100.00	2RDR
Di-n-butylphthalate	1.1840000	1.3084000	1.3084000	0.01	10.51	100.00	AVRG
bis(2-Ethylhexyl)phthalate	3.7678000	3.0000000	1.1693000	0.01	25.59	100.00	2RDR (1)
1,4-Dioxane	0.3420000	0.2971900	0.2971900	0.01	-13.10	100.00	AVRG
2-Methylnaphthalene-D10	0.9280000	0.8652600	0.8652600	0.01	-6.76	100.00	AVRG
2,4-Dibromophenol	0.5450000	0.5210800	0.5210800	0.01	-4.39	100.00	AVRG
Fluorene-D10	1.0719000	1.0000000	1.1699000	0.01	7.19	100.00	LINR

assoc samples: ALL

FORM VII PEST

(1) bis(2-ethylhexyl)phthalate (J) in EB01 - all others prev. qual! CR 10/31/10

FORM 7B
SEMIVOLATILE CALIBRATION VERIFICATION SUMMARY

Lab Name: KATAHDIN ANALYTICAL SERVICES Lab Code: KAS

Project: CTO-111 NTR VIEQUES SDG No.: SD5038

Instrument ID: GCMS-G Calibration Date: 08/31/10 Time: 0946

Lab File ID: G9252 Init. Calib. Date(s): 08/30/10 08/30/10

Init. Calib. Times: 1453 1826

GC Column: ZB5-MS ID: 0.25 (mm)

COMPOUND	RRF or AMOUNT	RRF1.0000 or AMOUNT	CCAL RRF1.0000	MIN RRF	%D or %DRIFT	MAX %D or %DRIFT	CURV TYPE
Pyrene-D10	1.0390000	1.1972000	1.1972000	0.01	15.23	100.00	AVRG

FORM VII PEST

YES NO N/A

ACTION: Circle errors in red.

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

15.0 Internal Standards (Form VIII)

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

ACTION: List each outlying internal standard below.

Sample ID	IS #	Area	LowerLimit	Upper Limit

(Attach additional sheets if necessary.)

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

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

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

	YES	NO	N/A
iii. If the IS area is below the lower limit (<50%), qualify all associated non-detects (U-values) "J". If extremely low area counts are reported (<25%) or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable (R).			
15.2 Are the retention times of all internal standards within 30 seconds of the associated calibration standard?	[✓]	___	___

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

16.0 Laboratory Control Samples (LCS)

	YES	NO	N/A
16.1 Were any LCS samples run in order to verify analytes which failed criteria for spike recovery?	[✓]	___	___
16.2 Did the lab spike LCS sample spiked with the same analytes and the same concentrations as the matrix spike?	[✓]	___	___
16.3 Were the mean and standard deviation of all analytes within the QC acceptance ranges as shown in Table 6, 8270D-43?	[ ]	✓	___

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

17.0 Field Duplicates

	YES	NO	N/A
17.1 Were any field duplicates submitted for semivolatile analysis?	[✓]	___	___

Katahdin
ANALYTICAL SERVICES

Cert No E87604

LCS/LCSD Recovery Report

LCS ID: WG81151-2RA
LCSD ID: WG81151-3RA
Project: QP 09-13-10
SDG: SD5038
Report Date: 10-SEP-10

Received Date: 19-AUG-10
Extract Date: 19-AUG-10
Extracted By: WS
Extraction Method: SW846 3550
Lab Prep Batch: WG81151

Analysis Date: 31-AUG-10
Analyst: JCG
Analysis Method: SW846 M8270C
Matrix: SL
% Solids: NA

Compound	Spike Amt	LCS Conc	LCS Rec (%)	LCSD Conc	LCSD Rec (%)	Conc Units	RPD (%)	RPD Limit	Limits
Naphthalene	66.7	68.8	103.*	85.2	128.*	ug/Kgdrywt	21	50	40-100
2-Methylnaphthalene	66.7	57.8	86.6	78.5	118.*	ug/Kgdrywt	30	50	40-100
Acenaphthylene	66.7	37.6	56.4	46.3	69.4	ug/Kgdrywt	21	50	40-100
Acenaphthene	66.7	41.1	61.6	49.1	73.6	ug/Kgdrywt	18	50	40-100
Fluorene	66.7	38.6	57.9	45.9	68.8	ug/Kgdrywt	17	50	40-100
Phenanthrene	66.7	47.7	71.5	56.9	85.3	ug/Kgdrywt	18	50	40-100
Anthracene	66.7	50.9	76.3	56.7	85.0	ug/Kgdrywt	11	50	40-100
Fluoranthene	66.7	57.7	86.5	62.4	93.6	ug/Kgdrywt	8	50	40-100
Pyrene	66.7	50.4	75.6	56.1	84.1	ug/Kgdrywt	11	50	40-100
Benzo (a) anthracene	66.7	54.3	81.4	57.8	86.6	ug/Kgdrywt	6	50	40-100
Chrysene	66.7	53.8	80.6	56.9	85.3	ug/Kgdrywt	6	50	40-100
Benzo (b) Fluoranthene	66.7	49.6	74.4	54.1	81.1	ug/Kgdrywt	9	50	40-100
Benzo(k)fluoranthene	66.7	46.8	70.2	50.6	75.9	ug/Kgdrywt	8	50	40-100
Benzo(a)pyrene	66.7	53.9	80.8	59.5	89.2	ug/Kgdrywt	10	50	40-100
Indeno (1,2,3-cd) pyrene	66.7	53.6	80.4	59.5	89.2	ug/Kgdrywt	10	50	40-100
Dibenzo (a,h) anthracene	66.7	56.0	84.0	63.2	94.8	ug/Kgdrywt	12	50	40-100
Benzo(g,h,i)perylene	66.7	62.6	93.8	69.4	104.*	ug/Kgdrywt	10	50	40-100
1,4-Dioxane	66.7	27.9	41.8	43.9	65.8	ug/Kgdrywt	44	50	30-150
Hexachloroethane	66.7	38.1	57.1	46.5	69.7	ug/Kgdrywt	20	50	30-150
2-Chloronaphthalene	66.7	38.8	58.2	44.8	67.2	ug/Kgdrywt	14	50	30-150
Hexachlorobenzene	66.7	41.0	61.5	48.3	72.4	ug/Kgdrywt	16	50	30-150
Pentachlorophenol	133.	51.3	38.6	64.5	48.5	ug/Kgdrywt	23	50	30-150
Carbazole	66.7	59.1	88.6	62.7	94.0	ug/Kgdrywt	6	50	30-150
Di-n-butylphthalate	66.7	70.1	105.	81.5	122.	ug/Kgdrywt	15	50	30-150
Bis(2-ethylhexyl)phthalate	66.7	211.	316.*	120.	180.*	ug/Kgdrywt	55*	50	30-150
2-Methylnaphthalene-D10			44.4		53.7				19-94
Fluorene-D10			52.8		59.6				20-96
Pyrene-D10			76.7		79.9				31-128
2,4-Dibromophenol			56.0		62.6				20-116

all ND or blank qual in samples
no qual necessary
CR 10/31/10

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029
http://www.katahdinlab.com

YES NO N/A

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

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

INORGANIC DATA VALIDATION SUMMARY

Site Name:	Vieques CTO-111	Laboratory:	Katahdin
Project Number:	617.90.01	Case/Order No.	SD4910
Sampling Date(s):	8/10, 8/11/2010		

Compound List: ☑ TAL ☐ Priority Pollutant ☐ Appendix IX ☐ Other _____

Method: ☐ CLP SOW ☐ 40 CFR 136 ☑ SW-846 Method 6020/7470/7471 ☐ Other _____

The following table indicates the data validation criteria examined, any problems identified, and the QA action applied.

Data Validation Criteria:	Accept	FYI	Qualify	Comments
Holding Times	✓			
Initial Calibrations	✓			
Continuing Calibrations	✓			
CRDL Standards	✓			
Blank Analysis Results			✓	Sb, Se (U)
ICP Interference Check Sample Recoveries			✓	various metals (J)
Duplicate Results			✓	Al, Ca, Mg (J) for TRPB
Field Duplicate Results				
Spike Analysis Recoveries			✓	Sb (J), K (J)
Serial Analysis Recoveries			✓	Na (J)
Laboratory Control Sample Results	✓			
Furnace AA QC Analysis NA				
Quantitation/Detection Limits	✓			
Overall Assessment of Data	✓			
Other IS	✓			

General Comments:

Accept – No qualification required.
FYI – For your information only, no qualification necessary
Qualify – Qualify as rejected, estimated or biased
NA – Not applicable.
NR – Not reviewed.

QA Scientist CR
Date 11/2/10

Revised 12/11/2000

crowshan

From: crowshan [crowshan@voicenet.com]
Sent: Thursday, October 28, 2010 7:30 PM
To: 'kperkins@katahdinlab.com'
Cc: Leslie Dimond; 'Shawne M. Rodgers'; MZamboni@ch2m.com; 'Juan.Acaron@CH2M.com'; Rebekha Shaw (Rebekha.Shaw@CH2M.com)
Subject: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Hi Kelly,

We are currently completing a validation review of data generated for the above referenced project. The following issues have arisen as a result of this review:

Metals:

1) The data package is missing the Form10 presenting soil LOQs. Please provide.
2) The data package is missing the 6020 tune report for the analyses on 8/27/10. Please provide.

Thank you for your assistance,

Caroline

Caroline Rowshan
Environmental Data Quality, Inc.
967 East Swedesford Road, Suite 404
Exton, PA 19341
Phone: (610) 719-1981
Fax: (610) 725-1781
crowshan@voicenet.com

crowshan

From: crowshan [crowshan@voicenet.com]
Sent: Friday, October 29, 2010 10:10 AM
To: 'Kelly Perkins'
Cc: 'dnadeau@katahdinlab.com'; 'jobrin@katahdinlab.com'; 'Shawne M. Rodgers'; MZamboni@ch2m.com; 'Juan.Acaron@CH2M.com'; Rebekha Shaw (Rebekha.Shaw@CH2M.com)
Subject: RE: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Hi Kelly,
Pages 4000070 and 4000071 present the CRDLs in aqueous units. I am looking for soil CRDLs (in mg/kg).
Thanks,
Caroline

Caroline Rowshan
Environmental Data Quality, Inc.
967 East Swedesford Road, Suite 404
Exton, PA 19341
Phone: (610) 719-1981
Fax: (610) 725-1781
crowshan@voicenet.com

From: Kelly Perkins [mailto:kperkins@katahdinlab.com]
Sent: Friday, October 29, 2010 9:48 AM
To: crowshan@voicenet.com
Cc: dnadeau@katahdinlab.com; jobrin@katahdinlab.com
Subject: FW: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Hi Caroline,

Please see response below and attached tunes. Do you need the package or EDD re-issued?
Kelly Perkins

Project Manager

Katahdin Analytical Services

600 Technology Way

Scarborough, ME 04074

(207) 874-2400 Ext. 17

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From: George [mailto:gbrewer@katahdinlab.com]
Sent: Friday, October 29, 2010 9:38 AM
To: 'Kelly Perkins'
Cc: jobrin@katahdinlab.com; 'Leslie Dimond'
Subject: RE: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Kelly,

crowshan

From: Deb Nadeau [dnadeau@katahdinlab.com]
Sent: Monday, November 01, 2010 4:01 PM
To: crowshan@voicenet.com
Cc: jobrin@katahdinlab.com; kperkins@katahdinlab.com; 'George'
Subject: RE: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910
Attachments: SOIL CRDL.PDF

Caroline,

Here are additional CRDL forms in soil units for SD4910.

Thanks,
Deb

Deborah Nadeau
Laboratory Operations Manager
Katahdin Analytical Services
A Woman-Owned Small Business Enterprise
600 Technology Way
Scarborough, Maine 04074
Direct - 207.874.2400 x19
Fax - 207.775.4029
www.katahdinlab.com

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From: Kelly Perkins [mailto:kperkins@katahdinlab.com]
Sent: Monday, November 01, 2010 9:27 AM
To: 'George'
Cc: dnadeau@katahdinlab.com; jobrin@katahdinlab.com
Subject: FW: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910
Importance: High

Kelly Perkins
Project Manager
Katahdin Analytical Services
600 Technology Way
Scarborough, ME 04074
(207) 874-2400 Ext. 17

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crowshan

From: crowshan [crowshan@voicenet.com]
Sent: Sunday, October 31, 2010 1:09 PM
To: MZamboni@ch2m.com
Cc: 'Shawne M. Rodgers'; Rebekha Shaw (Rebekha.Shaw@CH2M.com); 'Juan.Acaron@CH2M.com'
Subject: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Hi Mike,
Some of the metals results in this SDG will be estimated (J) due to concentrations found in the ICSA standard. Should I use "OT" as the qualifier code or would like me to use something else?

Thanks,
Caroline

Caroline Rowshan
Environmental Data Quality, Inc.
967 East Swedesford Road, Suite 404
Exton, PA 19341
Phone: (610) 719-1981
Fax: (610) 725-1781
crowshan@voicenet.com

crowshan

From: Kelly Perkins [kperkins@katahdinlab.com]
Sent: Friday, October 29, 2010 9:48 AM
To: crowshan@voicenet.com
Cc: dnadeau@katahdinlab.com; jobrin@katahdinlab.com
Subject: FW: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910
Attachments: JAH27B TUNES.pdf

Hi Caroline,

Please see response below and attached tunes. Do you need the package or EDD re-issued?

Kelly Perkins
Project Manager
Katahdin Analytical Services
600 Technology Way
Scarborough, ME 04074
(207) 874-2400 Ext. 17

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From: George [mailto:gbrewer@katahdinlab.com]
Sent: Friday, October 29, 2010 9:38 AM
To: 'Kelly Perkins'
Cc: jobrin@katahdinlab.com; 'Leslie Dimond'
Subject: RE: Data Validation Inquiry - Vieques CTO-111 - Katahdin Sample Delivery Group SD4910

Kelly,

Answers to metals validation questions:

1) The LOQs are in the package on pages 4000070 – 4000071. They're in the column labeled "CRDL".
2) I've attached the file containing the missing tunes. We're sorry for the error.

Can you forward to Caroline Rowshan? Also, do we need to do a reissue of the package or the EDD?

George Brewer
Inorganics Department Manager
Katahdin Analytical Services, Inc.
600 Technology Way
Scarborough, ME 04074
(207)874-2400, ext. 24
gbrewer@katahdinlab.com

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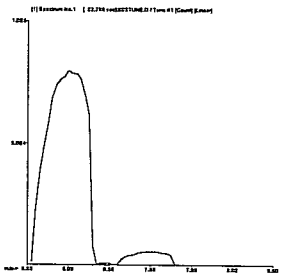
6020 QC Tune Report

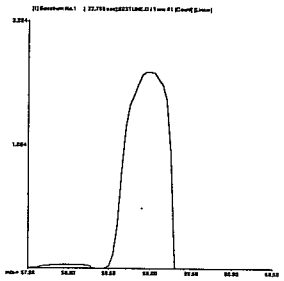
Data File: C:\ICPCHEM\1\DATA\JAH27A.B\003TUNE.D
Date Acquired: Aug 27 2010 10:03 am
Acq. Method: TN6020E.M
Operator: DWM
Sample Name: 6020 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN6020E.M

RSD (%)

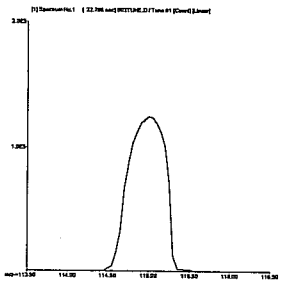
Element	Actual	Required	Flag
7 Li	1.20	5.00	
59 Co	1.21	5.00	
115 In	1.45	5.00	
205 Tl	0.95	5.00	



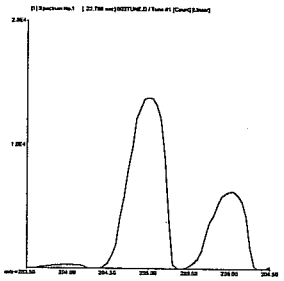
7 Li
Mass Calib.
Actual: 7.00
Required: 6.90 - 7.10
Flag:
Peak Width
Actual: 0.60
Required: 0.90
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:



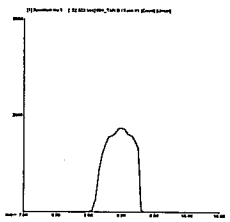
205 Tl
Mass Calib.
Actual: 205.00
Required: 204.90 - 205.10
Flag:
Peak Width
Actual: 0.65
Required: 0.90
Flag:

200.8 QC Tune Report

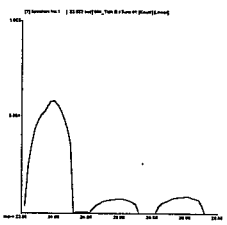
Data File: C:\ICPCHEM\1\DATA\JAH27A.B\004_TUN.D
Date Acquired: Aug 27 2010 10:05 am
Acq. Method: TN200_8E.M
Operator: DWM
Sample Name: 200.8 Tune
Misc Info:
Vial Number: 1107
Current Method: C:\ICPCHEM\1\METHODS\TN200_8E.M

RSD (%)

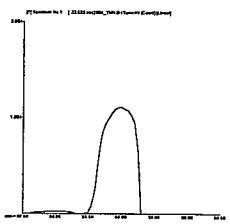
Element	Actual	Required	Flag
9 Be	0.65	5.00	
24 Mg	2.68	5.00	
59 Co	1.34	5.00	
115 In	1.31	5.00	
208 Pb	1.21	5.00	



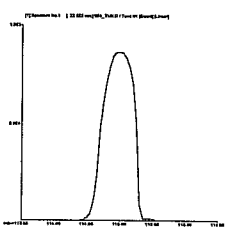
9 Be
Mass Calib.
Actual: 9.00
Required: 8.90 - 9.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



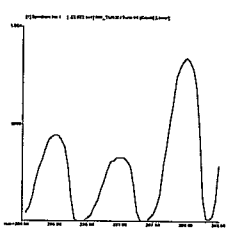
24 Mg
Mass Calib.
Actual: 24.00
Required: 23.90 - 24.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



59 Co
Mass Calib.
Actual: 59.00
Required: 58.90 - 59.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:



115 In
Mass Calib.
Actual: 115.00
Required: 114.90 - 115.10
Flag:
Peak Width
Actual: 0.70
Required: 1.00
Flag:



208 Pb
Mass Calib.
Actual: 208.00
Required: 207.90 - 208.10
Flag:
Peak Width
Actual: 0.65
Required: 1.00
Flag:

Tune Result: Pass

Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILMO5.3 (SOP Revision 13)

PREPARED BY: Hanif Sheikh Date: 12-08-06
Hanif Sheikh, Chemist
Hazardous Waste Support Section

Peer Reviewed by: Russell Arnone Date: 12-08-06
Russell Arnone, Chemist
Hazardous Waste Support Section

Concurred by: Linda M. Mauel Date: 12/8/06
Linda Mauel, Chief
Hazardous Waste Support Section

Approved by: Robert Runyon Date: 12/11/06
Robert Runyon, Chief
Hazardous Waste Support Branch

Hanif Sheikh 8/10/09
Annual Review

Reviewed by: Hanif Sheikh Date: 2/10/09
Name

Reviewed by: _____ Date: _____
Name

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1.0 Scope

1.1 This Standard Operating Procedure (SOP) applies to the evaluation of Routine Analytical Services (RAS) inorganic data generated in accordance with the EPA Contract Laboratory Program (CLP) protocols.

1.2 This Region 2 inorganic data validation SOP is used to determine the usability of analytical data generated from water and soil/sediment samples collected from Superfund sites in EPA Region 2.

1.3 Data should be generated and validated in accordance with the site specific Project Quality Objectives (PQOs) developed prior to the sample collection event. This SOP can be customized to validate the data according to the site specific PQOs. If the site specific DQOs are not available, this SOP must be used in its entirety.

1.4 This SOP is based, for the most part, upon analytical and quality assurance requirements specified in the Statement of Work SOW-ILM05.3, as well as in the final (October 2004) of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. The SOP Checklist, Appendix A.1, provides guidance in conducting the data validation. The result of the use of this SOP is a **Total Review** of the data: **Technical plus Contract - Compliance Review.**

2.0 Contract Compliance Review

This type of review is the first step in data validation which is carried out to ensure that the CLP laboratory has analyzed the environmental samples in accordance with the Statement of Work (SOW), and provided a data package which is both complete and compliant. This means that laboratory's procedures were performed exactly as specified in the CLP Statement of Works (SOW) and the data package contains all the deliverables including the information required under the contract.

2.1 Completeness

The data validator must check the entire data package to ensure that all deliverables required under the CLP contract are present and legible. In addition, copies of the Contract Compliance Screening (CCS) report, re-submittal from the laboratory, and Regional documentation should also be present in the data package. In Region 2, the data package completeness check is currently performed by the Regional Sample Control Coordinator (RSCC)for each Sample Delivery Group (SDG). The data package is not released to the data validator until all the required deliverables are received
from the laboratory.

2.2 Compliance

The data validator must check to ensure that all steps from sample receipt through sample preparation, analysis, data calculation and reporting are documented, and the information/data required under the contract is present in the appropriate reporting Forms and laboratory logs.

2.3 Contract Compliance Screening (CCS)

This screening step essentially checks the data package for the Completeness and Compliance requirements, and is performed by the Sample Management Office (SMO) currently operated by Computer Sciences Corporation (CSC), an EPA contractor. The CCS Report outlines the incomplete and non-compliant items as "Defects" in the data package, and is sent to the laboratory which is required to

provide additional or missing information/data required under the contract. The CCS Report for each SDG is transmitted electronically by the SMO to the Regional office. The CCS Report is intended to aid the data validator in locating any problems, both corrected and uncorrected. The incorrect original deliverable(s)of the data package must be replaced by the re-submittal(s)received from the laboratory in response to the CCS Report. The data validation should, however, be carried out even if the CCS Report is not available.

Web-based CCS is available for CLP laboratories to check their data prior to its delivery to EPA.

3.0 **Technical Review**

Technical review of the RAS data is carried out on the complete and compliant data to ensure its **validity** (i.e., data is of known quality and scientifically valid) and **usability** (i.e., data set is sufficiently complete and of sufficient quality to support a decision or an action described in the specific objectives of a data collection activity). The technical review process provides information on analytical limitations of data, if any, based on specific Quality Assurance/Quality Control (QA/QC) criteria. This is accomplished by performing an in-depth review of both the field deliverables which document the field sampling activities, and the laboratory analytical data deliverables which document the laboratory activities carried out to generate the reported data. Essentially, the validator shall first ensure that the data package is complete and compliant. The validator shall then evaluate data/information on all these deliverables (Final data sheets, Forms for QC analyses Chain-of-Custody/Traffic Report Forms, raw data, etc.) against the QA/QC acceptance criteria specified in the SOP "Checklist" (Appendix A.1). The validator must answer each question in the " Checklist" and take an appropriate action as required under "Action" to qualify the data. As a result of the technical review, the data validator may qualify some of the data as **rejected** or as **estimated.** The data validator shall write a **Data Review Narrative** documenting the qualified data and the reason(s) for the qualification.

3.1 If the **raw data** necessary to support the reported results are not provided, the data validation must not be performed. The laboratory must be contacted to obtain missing raw data.

3.2 If batch quality control analyses are performed on samples other than **site specific samples**, data must not be validated
or at best be considered as estimated. The data user must be notified of this action.

3.3 **QA/QC Acceptance Criteria**

In order that reviews be consistent among reviewers, QA/QC protocol (stated in Appendix A.I) should be strictly adhered to. If a lab provides more than one set of QC analyses or more than one particular QC analysis for an SDG, the validator shall use the worst QC analysis to evaluate the SDG data. Professional judgement should only be used in the rare instances not addressed in the "Checklist".

3.4 **Data Validation Flags**

Three types of data validation flags (J, R & U) are used in Region 2 to qualify the data.

3.4.1 **Flag "R" indicates Rejected Data**

Sample results determined to be unacceptable must preferably be lined over and flagged " R" with a red pencil only on the Inorganic Analysis Data Sheets (CLP Form I's). Data rejected on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user **must not** use the rejected data to make environmental decisions.

3.4.2 **Flag "J" indicates Estimated Data**

Sample results determined to be estimated must be flagged "J" with a red pencil only on the CLP Form I's. Data are flagged (J) when a QC analysis falls outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result even though several associated QC analyses may fail. The "J" data may be biased high or low.

3.4.3 **Flg "U" indicates Non-Detects**

Sample results ≥ MDL associated with a contaminated blank are flagged "U" with a red pencil only on Form I's.

4.0 **Contractual Qualifiers**

The CLP laboratory applies contractual qualifiers on all Form I'S and the QC Forms when QC analyses are outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets with the exception of U and J. The contractual qualifiers and their meanings are as follows:

N : This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E : This qualifier indicates the presence of interference, and is applied when the ICP serial dilution analysis is outside the control limits.

* : This qualifier indicates the lack of precision, and is applied to sample results on Form I's and Form VI when the Lab Duplicate analysis is outside the control limits.

U : This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit(MDL). A non-detected result of an analysis is indicated by the Contract Required Quantitation Limit (CRQL) of that analyze suffixed with "U".

J : This is a concentration qualifier that the laboratory applies to a positive result below the CRQL(i.e.,≥MDL but <CRQL).

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

4.0 Rounding Rule

The data reviewer must follow the standard practice to round off percent recoveries on the QC reporting forms.

5.0 Data Review Narrative (Appendix A.2)

The data review narrative should be written using the format of Appendix A.2. The narrative should indicate the QC analyses outside the acceptance limits and the actions taken to qualify the associated data. The narrative should be prepared on a Personal Computer or a typewriter. If hand-written, under no circumstances should a pencil be used to write the narrative. The Data Review Narrative should be written in four (4) Sections: (i)Data Case Description, (ii)Complete SDG File (CSF) Audit Section, (iii) Technical Review Section, and (iv) Contract-Problems/Non-Compliance Section.

5.1 Data Case Description Section

The data validator must briefly describe the data case in this Section, outlining important information such as the number of samples, their matrix, sampling date(s), analysis (TAL metals, mercury or cyanide), samples used for QC analyses, Field Blank(s), Field Duplicates, etc.

5.2 Complete SDG File (CSF) Audit Section

The data validator must perform an audit on each SDG in the data package to ensure that all SDG-specific documents (sampling, samples shipping and receiving, telephone contact logs, etc.) are present in the data case. The audit shall also discover any discrepancy in the deliverables. In Region 2, this audit is currently performed by the ESAT data validator and its findings reported under "Comments" on a CSF inventory checklist. The validator informs the CLP Project Officer (PO) of the missing or additional information/deliverable required for data validation. The PO then contacts the lab for the desired deliverable/information. The findings of the CSF audit are reported in the CSF Section of the Data Review Narrative (Appendix A.2).

5.3 Technical Review Section

The data validator shall report in this Section only the rejected (R) and estimated data (J) and the data rendered non-detects (U) as a result of technical review. It is imperative that the data reviewer highlights (i) QC analysis criteria applied to reject (R) or flag (J, U) the data, (ii) Samples rejected (R) or flagged (J, U), and (iii) the QC analysis out of control limits. The rest of the data that are not qualified (rejected or estimated) are not reported in this Section, and should be considered **fully useable.**

5.4 Contract-Problems/Non-Compliance Section

All the CLP non-compliant items detected during data review must be reported in this Section.

6.0 Computer-Aided Data Review and Evaluation (CADRE)

CADRE is a computer program that performs semi-automated Quality Assurance (QA) and Quality Control (QC) checks of results from the chemical analysis of soil and water samples according to the CLP protocols. After the CADRE data qualification is complete, a Lotus 1,2,3 spreadsheet or an XLS spreadsheet with data validation qualifiers (R,J,U) is generated for each SDG. Currently, Sample Management Office (SMO) performs this task using Data Assessment Tool (DAT), a software-driven process, and forwards to the Regions the customized electronic spreadsheets (Lotus 1,2,3 or XLS spreadsheet) and QC reports via the DART (Data Assessment Rapid Transmittal) system. Manual data validation is performed in conjunction with electronic data validation which can only be done by a trained and experienced data validator. The manual data review complements CADRE's findings to complete an assessment of data quality in a shorter time than by a solely manual process. The data validator must review the XLS or Lotus 1,2,3 spreadsheet against Form I's to ensure that the same results on Form I's and the Spreadsheet are qualified with the same data validation qualifiers. The spreadsheet for each SDG is provided with the Data Review Narrative.

7.0 Performance Evaluation Sample(PES)Based Data Validation Strategy

7.1 Scope and Summary

This strategy offers the use of Performance Evaluation Samples (PES) in the data validation process as a means of ensuring the quality of the CLP data while significantly reducing the validation time. The single blind PES provided by EPA (or any other reputable firm) is analyzed with samples of each matrix in a Sample Delivery Group (SDG). A software program (e.g.,PEAC TOOLS, SPS Web or equivalent)is used to determine whether or not the PES results fall within the previously statistically determined acceptance limits ("Action Low" and "Action High")for the Contaminants of Concern (**COC**). The PES results falling within the Action Limits are considered as acceptable results and may be designated as "Passed" analytes, and results of the analytes falling outside the Action Limits are considered as unacceptable and may be designated as "Failed" analytes. In either case ("Passed" Analytes or "Failed" analytes), the associated data is validated according to the Region 2 data validation SOP HW-2 in conjunction with the latest version of the WinCadre QC reports. The following strategy (procedure) is used:

7.2 "Passed" COC

If the COC in an SDG are within statistically generated Action Limits, the data validation is conducted according
to QC analyses indicated by check marks (√)in the "Review COC For" column of the Table I. The SDG samples are validated using the Region 2 data validation SOP in

conjunction with the latest version of the WinCADRE QC reports. The validation flags (J, R, U) are applied on Form I's as well on the CADRE Lotus 1,2,3 or XLS spreadsheet. Corrections, if needed, are
then made on the Lotus or XLS spreadsheet to ensure that all results on Form I's carry the same data validation and concentration flags as are on the Lotus or XLS Spreadsheet.

7.3 **"Failed" COC**

If the COC in an SDG are not within the statistically generated Action Limits, the data validation is conducted according to the data validation SOP QC Criteria indicated by check marks (√)in the "Review COC For" column of Table II. The SDG samples are validated using the Region 2 data validation SOP in conjunction with the latest version of the WinCADRE QC reports. The data validation flags (J,R,U) are applied on Form I's as well on the CADRE Lotus 1,2,3 or XLS Spreadsheet. Corrections, if needed, are then made on the Lotus or XLS spreadsheet to ensure that all results on Form I's carry the same data validation and concentration flags as are on the Lotus or XLS Spreadsheet.

7.4 **COC "Not Evaluated"**

Acceptance limits for the analytes not present/spiked in the PE sample are not provided on the PES Scoring Evaluation Report. Such analytes will be marked as "Not Evaluated" in the PES Evaluation Column. These analytes will be validated much the same way as the "Failed Analytes".

The failed analytes and the analytes not present/spiked in the PE sample require data validation according to the QC criteria specified in Table II, and are identified by the TOPO in the TDF for the Case/SDG.

Table I

Passed PES - All Contaminants of Concern are within the limits
(Action Low ≤ PES Result ≤ Action High)

QC Criteria	Review COC for
Holding Time & Preservation	√
Initial Calibration	
Initial Calibration Verification	
CRQL Standard	√
Blanks-Initial & Continuing	
Preparation Blank	
ICP Interference Check Sample	
Pre- Digestion/Distillation Matrix Spike	
Post Digestion Spike	
Laboratory Duplicate	
Field Duplicates Comparison	√
Lab Control Sample	
ICP Serial Dilution	
Field Blank Contamination	√
Percent Solids	√
Transcription/Computation Check	
Raw Data	
Total vs. Dissolved Concentrations Comparison	√

- The CSF (Complete SDG File) audit will be completed before the PES validation strategy is applied.
- Comparison of the Lotus or XLS Spreadsheet must be after the PES validation strategy is applied. The Contract
- Compliance can be checked after the PES validation strategy is applied.

Table II
Failed PES - Contaminants of Concern are not within the limits
(PES Result ≤ Action Low, PES Result ≥ Action High **OR** The Limits Not Established)

QC Criteria	Review COC for
Holding Time & Preservation	√
Initial Calibration	
Initial Calibration Verification	
CRQL Standard	√
Blanks-Initial & Continuing	
Preparation Blank	√
ICP Interference Check Sample	
Pre- Digestion/Distillation Matrix Spike	√
Post Digestion Spike	
Laboratory Duplicate	√
Field Duplicates Comparison	√
Lab Control Sample	√
ICP Serial Dilution	√
Field Blank Contamination	√
Percent Solids	√
Transcription/Computation Check	√
Raw Data	
Total vs. Dissolved Concentrations Comparison	√

- The CSF (Complete SDG File) audit will be completed before the PES validation strategy is applied.
- Comparison of the Lotus or XLS Spreadsheet must be after the PES validation strategy is applied.
- The Contract Compliance can be checked after the PES validation strategy is applied.

8.0 **Sampling Trip Report**

The sampler prepares a Sampling Trip Report for each sampling event and sends it to the RSCC. The report provides details of all activities performed for each sampling event on the Superfund site. It also lists the field QC samples such as Field Duplicates, Field/Rinse Blanks, sampling time and date for each sample, and samples associated with each field/rinse blank. The validator must use this information to evaluate the Field Duplicate pairs as well as the samples associated with contaminated Field/Rinse Blanks.

9.0 **Telephone Record Log (Appendix A.3)**

A Telephone Record Log (Appendix A.3) must be written by the data validator when a deliverable is missing or a clarification is needed about a lab procedure. The data validator should outline a basic profile of the Case on the Telephone Record Log Form, clearly indicating the reason(s) for inquiry and forward this Form to CLP PO/TOPO who will contact the lab to receive the missing document or information. The original Telephone Record Log is kept in the data package and a copy attached to the Data Review Narrative.

10.0 **Request for Re-Analysis (Appendix A.6)**

Data validator must note all items of contract non-compliance in the Data Review Narrative. If holding times and sample storage times have not been exceeded, the Project Officer (PO) may request re-analysis if items of non-compliance are critical to data assessment. Requests are to be made on "CLP Re-Analysis Request/Approval Record" form (Appendix A.4).

11.0 **CLP Data Assessment Summary Form (Appendix A.7)**

Fill in the total number of analytes performed by different methods and the number of analytes rejected (R) or flagged (J) as estimated due to corresponding quality control criteria. Place an "X" in boxes wherever analyses were not performed, or criteria do not apply.

12.0 **Data Review Log:**

It is recommended that the data validator maintain a log of the reviews completed to document:

a. Case number
b. SDG # (s)
c. number of samples
d. matrix of samples
e. contract laboratory
f. site name
g. start-date of the data case review
h. completion-date of the data case review
i. actual hours spent
j. reviewer's signature

13.0 **Record of Communication** -

This is a Regional document prepared and provided by the RSCC for each data package. The ROC indicates the Case #, site name, samples and sample matrix and the laboratory name. The presence of a ROC in a data package is an indication that the package has been reviewed by the RSCC for completeness and is ready for data validation.

14.0 **Forwarded Paperwork**

Upon completion of review, the following are to be forwarded to EPA for final review:

a. Data package
b. Completed data assessment checklist (Appendix A.1,original)
c. Original and a copy of completed data review narrative Appendix A.2)
d. CLASS Contract Compliance Screening (CCS) report
e. Telephone Record Log (Appendix A.3)
f. Field Duplicates Form (Appendix A.4)
g. Total/Dissolved Concentrations Form (Appendix A.5)
h. CLP Re-analysis Request/Approval Record Form (Appendix A.6)
i. Data Assessment Summary Form (Appendix A.7)
j. CADRE Spreadsheet on a computer diskette.

ACRONYMS

AA	Atomic Absorption
AOC	Analytical Operations/Data Quality Center
CADRE	Computer-Aided Data Review and Evaluation
CCB	Continuing Calibration Blank
CCS	Contract Compliance Screening
CCV	Continuing Calibration Verification
CLP	Contract Laboratory Program
CO	Contracting Officer
COC	Contaminants of Concern
CRI	CRQL Check Standard
CRQL	Contract Required Quantitation Limit
CSF	Complete SDG File
CVAA	Cold Vapor AA
DART	Data Assessment Rapid Transmittal
DAT	Data Assessment Tool
DF	Dilution Factor
DQO	Data Quality Objective
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICP-AES	Inductively Coupled Plasma - Atomic Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma - Mass Spectrometry
ICS	Interference Check Sample
ICV	Initial Calibration Verification
LCS	Laboratory Control Sample
LRS	Linear Range Sample
MDL	Method Detection Limit
NIST	National Institute of Standards and Technology
OERR	Office of Emergency and Remedial Response
OSWER	Office of Solid Waste and Emergency Response
PB	Preparation Blank
PE	Performance Evaluation
%D	Percent Difference
%R	Percent Recovery
%RI	Percent Relative Intensity
%RSD	Percent Relative Standard Deviation
%S	Percent Solids
PO	Project Officer
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RPD	Relative Percent Difference
RSCC	Regional Sample Control Center

SDG	Sample Delivery Group
SMO	Sample Management Office
SOP	Standard Operating Procedure
SOW	Statement of Work
TAL	Target Analyze List
TR/COC	Traffic Report/Chain of Custody Documentation

Inorganic Target Analyze List And Contract Required Quantitation Limits (CRQLs)

Analyze	CAS Number	ICP-AES CRQL Water Ug/L	ICP-AES CRQL Soil mg/kg	ICP-MS CRQL Water Ug/L
Aluminum	7429-90-5	200	20	---
Antimony	7440-36-0	60	6	2
Arsenic	7440-38-2	10	1	1
Barium	7440-39-3	200	20	10
Beryllium	7440-41-7	5	0.5	1
Cadmium	7440-43-9	5	0.5	1
Calcium	7440-70-2	5000	500	-----
Chromium	7440-47-3	10	1	2
Cobalt	7440-48-4	50	5	1
Copper	7440-50-8	25	2.5	2
Iron	7439-89-6	100	10	----
Lead	7439-92-1	10	1	1
Magnesium	7439-95-4	5000	500	-----
Manganese	7439-96-5	15	1.5	1
Mercury	7439-97-6	0.2	0.1	---
Nickel	7440-02-0	40	4	1
Potassium	7440-09-7	5000	500	-----
Selenium	7782-49-2	35	3.5	5
Silver	7440-22-4	10	1	1
Sodium	7440-23-5	5000	500	-----
Thallium	7440-28-0	25	2.5	1
Vanadium	7440-62-2	50	5	1
Zinc	7440-66-6	60	6	2
Cyanide	57-12-5	10	2.5	----

Site: Vieques CTO-111

Case #:

SDG #: SD4910

Samples: **Soil** **Water**

	YES	NO	N/A
.1.1 **Contract Compliance Screening Report**			
Present?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
.1.2 **Record of Communication (from RSCC)**			
Present?	[ ]		✓
ACTION: If no, request from the RSCC.			
.1.3 **Sampling Trip Report**			
Present and complete?	[ ]		✓
ACTION: If no, contact RSCC/PO.			
.1.4 **Chain of Custody/Sample Traffic Report**			
Present?	[✓]		
Legible?	[✓]		
Signature of sample custodian present?	[✓]		
ACTION: If no, contact RSCC/WAM/PO.			
.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**

	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.

..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.

..1.8 Raw Data

Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.

..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
.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.)			
.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.

..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".

.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".

.1.10 **Final Data Correctness - Form I**

.1.10.1 Are Form I's for all samples

Sample_Name	Lab_Sample_ID	DateTime_	Extraction_	Analysis_D	EHT	AHT	Analytical_Method	SDG
VEPQIR-EB01-081010	SD4910-002	8/10/2010	8/17/2010	8/20/2010		10	6020	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-EB01-081110	SD4910-007	8/11/2010	8/17/2010	8/20/2010		9	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	9/1/2010		21	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/24/2010	8/30/2010		19	6020	SD4910
VEPQIR-EB01-081010	SD4910-002	8/10/2010	8/17/2010	8/18/2010		8	7470A	SD4910
VEPQIR-EB01-081110	SD4910-007	8/11/2010	8/17/2010	8/18/2010		7	7470A	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-EB01-081010	SD4910-2	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SS02-0304-0810	SD4910-3	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SB02-0709-0810	SD4910-4	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SB02P-0709-0810	SD4910-5	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-EB01-081110	SD4910-7	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910
VEPQIR-SS01-0405-0810	SD4910-8	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910
VEPQIR-SB01-0810-0810	SD4910-9	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910

10/29/10

	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~~ LOD 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.

.1.11 **Initial Calibration**

	YES	NO	N/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.

.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).

.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.

..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".

..1.13 **CRQL Standard Analysis - Form IIB**

..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? [✓] ___ ___

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%?	[✓]	___	___
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 150%, 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.

1.14 Initial and Continuing Calibration Blanks - Form III

	YES	NO	N/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.,

.1.15 **Preparation Blank - FORM III**

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

	YES	NO	N/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).

.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
.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~~ LOD 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.			
.1.16	**ICP-AES/ICP-MS Interference Check Sample (ICS) - Form IV** **NOTE:** Not required for CN, Hg, Al, Ca, Fe and Mg.			
.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.			
.1.16.2	**ICP-AES Method**			
.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".

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services SDG Name: SD4910

Concentration Units: ug/L

SAMPLE: ICSA

File: JAH20A Aug 20, 2010 18:20

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	95540	95.5
ANTIMONY	0	0	
ARSENIC	0	0	
BARIUM	1	1	
BERYLLIUM	0	0	
CADMIUM	0	0	
CALCIUM	100000	95570	95.6
CHROMIUM	0	2	•
COBALT	0	0	
COPPER	0	1	•
IRON	100000	93580	93.6
LEAD	0	0	
MAGNESIUM	100000	95510	95.5
MANGANESE	0	2	•
MOLYBDENUM	2000	1950	97.5
NICKEL	0	1	•
POTASSIUM	100000	97930	97.9
SELENIUM	0	0	
SILVER	0	0	
SODIUM	100000	97400	97.4
THALLIUM	0	0	
VANADIUM	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JAH20A Aug 20, 2010 18:24

Analyte	TRUE	FOUND	% R	
ALUMINUM	100000	94740	94.7	
ANTIMONY	20	20	100.0	
ARSENIC	20	20	100.0	
BARIUM	21	21	100.0	
BERYLLIUM	20	21	105.0	
CADMIUM	20	19	95.0	
CALCIUM	100000	96100	96.1	
CHROMIUM	20	22	110.0	1
COBALT	20	20	100.0	
COPPER	20	20	100.0	1
IRON	100000	94680	94.7	
LEAD	20	21	105.0	
MAGNESIUM	100000	95990	96.0	
MANGANESE	20	22	110.0	1
MOLYBDENUM	2000	1991	99.6	
NICKEL	20	20	100.0	2
POTASSIUM	100000	96230	96.2	
SELENIUM	20	20	100.0	
SILVER	20	18	90.0	
SODIUM	100000	96340	96.3	
THALLIUM	20	21	105.0	
VANADIUM	20	21	105.0	
ZINC	20	19	95.0	

assoc samples:
EB01-081010
EB01-081110

10/28/10

FORM IV - IN

(1) pos results (J) in assoc samples
(2) ND in assoc samples; no qual necessary

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services SDG Name: SD4910

Concentration Units: ug/L

SAMPLE: ICSA

File: JAH25A Aug 25, 2010 11:03

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	99630	99.6
ANTIMONY	0	0	
ARSENIC	0	0	
BARIUM	1	2	
BERYLLIUM	0	0	
CADMIUM	0	0	
CALCIUM	100000	98840	98.8
CHROMIUM	0	2	
COBALT	0	0	
COPPER	0	1	
IRON	100000	96010	96.0
LEAD	0	0	
MAGNESIUM	100000	98230	98.2
MOLYBDENUM	2000	2001	100.1
NICKEL	0	1	
POTASSIUM	100000	99240	99.2
SELENIUM	0	0	
SILVER	0	0	
SODIUM	100000	98980	99.0
THALLIUM	0	0	
VANADIUM	0	0	
ZINC	0	1	

SAMPLE: ICSAB

File: JAH25A Aug 25, 2010 11:06

Analyte	TRUE	FOUND	% R	
ALUMINUM	100000	97850	97.9	
ANTIMONY	20	20	100.0	
ARSENIC	20	20	100.0	
BARIUM	21	22	104.8	(+)
BERYLLIUM	20	20 ✓	100.0	
CADMIUM	20	19	95.0	
CALCIUM	100000	98520	98.5	
CHROMIUM	20	22	110.0	(1)
COBALT	20	20	100.0	
COPPER	20	20	100.0	(1)
IRON	100000	95860	95.9	
LEAD	20	21	105.0	
MAGNESIUM	100000	96110	96.1	
MOLYBDENUM	2000	2017	100.8	
NICKEL	20	20	100.0	(1)
POTASSIUM	100000	99090	99.1	
SELENIUM	20	20	100.0	
SILVER	20	19	95.0	
SODIUM	100000	97100	97.1	
THALLIUM	20	21	105.0	
VANADIUM	20	21	105.0	
ZINC	20	19	95.0	

assoc samples: Ba - all
Cr - -3,-4,-5,-9
Cu - all
Ni - all

(1) pos results (+) in assoc samples

CR
10/30/10

FORM IV - IN

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SD4910

Concentration Units: ug/L

SAMPLE: ICSA

File: JAH27A Aug 27, 2010 11:39

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	95250	95.3
ANTIMONY	0	0	
CALCIUM	100000	95030	95.0
CHROMIUM	0	2	*
COPPER	0	1	*
IRON	100000	92850	92.8
MAGNESIUM	100000	94440	94.4
MANGANESE	0	2	*
MOLYBDENUM	2000	1899	95.0
POTASSIUM	100000	96230	96.2
SODIUM	100000	95800	95.8
ZINC	0	1	

(1) N/A

SAMPLE: ICSAB

File: JAH27A Aug 27, 2010 11:42

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	93180	93.2
ANTIMONY	20	20	100.0
CALCIUM	100000	95110	95.1
CHROMIUM	20	21	105.0
COPPER	20	19	95.0
IRON	100000	92950	93.0
MAGNESIUM	100000	92570	92.6
MANGANESE	20	21	105.0
MOLYBDENUM	2000	1999	100.0
POTASSIUM	100000	93670	93.7
SODIUM	100000	91490	91.5
ZINC	20	19	95.0

(1)

assoc samples: Cr - -08
Cu - QC only - NA
Mn - -3, -4, -5, -8

10/29/10

(1) pos results (J) in assoc samples

ICP INTERFERENCE CHECK SAMPLE

Lab Name: Katahdin Analytical Services **SDG Name:** SD4910

Concentration Units: ug/L

SAMPLE: ICSA

File: JAH30A Aug 30, 2010 11:24

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	97650	97.7
CALCIUM	100000	98080	98.1
COPPER	0	1	• NA
IRON	100000	96430	96.4
MAGNESIUM	100000	96800	96.8
MANGANESE	0	2	• 1
MOLYBDENUM	2000	1953	97.7
POTASSIUM	100000	97990	98.0
SODIUM	100000	99640	99.6

SAMPLE: ICSAB

File: JAH30A Aug 30, 2010 11:27

Analyte	TRUE	FOUND	% R
ALUMINUM	100000	93430	93.4
CALCIUM	100000	95710	95.7
COPPER	20	19	95.0
IRON	100000	94540	94.5
MAGNESIUM	100000	94040	94.0
MANGANESE	20	22	110.0
MOLYBDENUM	2000	1964	98.2
POTASSIUM	100000	95810	95.8
SODIUM	100000	96730	96.7

assoc sample: Cu - QC only / NA
Mn - -09

CR 10/29/10

1 pos result (J) in assoc sample

		YES	NO	N/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).

.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
.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 N/A EB only			
	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.)			
.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.)			
.1.18 **Lab Duplicates) - Form VI**			
.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?	[✓]	___	___

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services

Client Field ID: PQIR-SS01-0405-0810S

Matrix: SOIL

SDG Name: SD4910

Percent Solids: 84.0

Lab Sample ID: SD4910-008P

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M
ALUMINUM, TOTAL	35871.4957		33794.1437		185.98	1117.0		75	125	MS
ANTIMONY, TOTAL	2.3708		0.6168		9.3	18.9	N	75	125	MS (1)
ARSENIC, TOTAL	8.6436		0.9905		9.3	82.3		75	125	MS
BARIUM, TOTAL	269.8150		81.4289		185.98	101.3		75	125	MS
BERYLLIUM, TOTAL	4.6635		0.3738		4.65	92.3		75	125	MS
CADMIUM, TOTAL	21.2765		0.0331	J	23.25	91.4		75	125	MS
CALCIUM, TOTAL	8050.7446		6495.8573		232.48	668.8		75	125	MS
CHROMIUM, TOTAL	32.1751		16.0920		18.6	86.5		75	125	MS
COBALT, TOTAL	58.9567		11.6815		46.5	101.7		75	125	MS
COPPER, TOTAL	72.4869		52.0407		23.25	87.9		75	125	MS
IRON, TOTAL	33825.6813		35279.7020		92.99	-1563.6		75	125	MS
LEAD, TOTAL	11.3264		2.1199		9.3	99.0		75	125	MS
MAGNESIUM, TOTAL	5484.1775		4982.6178		464.96	107.9		75	125	MS
MANGANESE, TOTAL	707.2009		550.8561		46.5	336.2		75	125	MS
MERCURY, TOTAL	0.1928		0.0095	U	0.2	96.4		75	125	CV
NICKEL, TOTAL	50.5874		7.0679		46.5	93.6		75	125	MS
POTASSIUM, TOTAL	2743.2511		1307.0145		929.92	154.4	N	75	125	MS (2)
SELENIUM, TOTAL	8.2251		0.4290	J	9.3	83.8		75	125	MS
SILVER, TOTAL	4.2692		0.0161	J	4.65	91.5		75	125	MS
SODIUM, TOTAL	1049.4098		394.1343		697.44	94.0		75	125	MS
THALLIUM, TOTAL	8.5692		0.0357	J	9.3	91.8		75	125	MS
VANADIUM, TOTAL	156.9233		113.9543		46.5	92.4		75	125	MS
ZINC, TOTAL	73.2774		28.1010		46.5	97.2		75	125	MS

Comments:

(1) (J) in all samples not prev qual (-09)

(2) (J) in all samples

FORM V (Part 1) - IN

5A

SPIKE SAMPLE RECOVERY

Lab Name: Katahdin Analytical Services | **Client Field ID:** PQIR-SS01-0405-0810S

Matrix: SOIL | **SDG Name:** SD4910

Percent Solids: 84.0 | **Lab Sample ID:** SD4910-008S

Concentration Units : mg/Kgdrywt

Analyte	Spiked Sample Result	C	Sample Result	C	Spike Added	%R	Q	Control Limits (%R) Low	High	M	
ALUMINUM, TOTAL	23762.0788		33794.1437		175.04	-5731.3		75	125	MS	
ANTIMONY, TOTAL	2.9145		0.6168		8.75	26.3	N	75	125	MS	1
ARSENIC, TOTAL	8.3933		0.9905		8.75	84.6		75	125	MS	
BARIUM, TOTAL	268.0782		81.4289		175.04	106.6		75	125	MS	
BERYLLIUM, TOTAL	4.3980		0.3738		4.38	91.9		75	125	MS	
CADMIUM, TOTAL	20.7295		0.0331	J	21.88	94.6		75	125	MS	
CALCIUM, TOTAL	4091.6287		6495.8573		218.8	-1098.8		75	125	MS	
CHROMIUM, TOTAL	39.3847		16.0920		17.5	133.1	N	75	125	MS	2
COBALT, TOTAL	57.5454		11.6815		43.76	104.8		75	125	MS	
COPPER, TOTAL	62.0308		52.0407		21.88	45.7	N	75	125	MS	2
IRON, TOTAL	29984.8552		35279.7020		87.52	-6049.9		75	125	MS	
LEAD, TOTAL	10.4063		2.1199		8.75	94.7		75	125	MS	
MAGNESIUM, TOTAL	3426.4655		4982.6178		437.61	-355.6		75	125	MS	
MANGANESE, TOTAL	748.5274		550.8561		43.76	451.7		75	125	MS	
MERCURY, TOTAL	0.2020		0.0095	U	0.2	101.0		75	125	CV	
NICKEL, TOTAL	56.6264		7.0679		43.76	113.3		75	125	MS	
POTASSIUM, TOTAL	1777.3422		1307.0145		875.21	53.7	N	75	125	MS	3
SELENIUM, TOTAL	7.9294		0.4290	J	8.75	85.7		75	125	MS	
SILVER, TOTAL	4.3148		0.0161	J	4.38	98.1		75	125	MS	
SODIUM, TOTAL	941.2934		394.1343		656.41	83.4		75	125	MS	
THALLIUM, TOTAL	8.2139		0.0357	J	8.75	93.5		75	125	MS	
VANADIUM, TOTAL	152.0248		113.9543		43.76	87.0		75	125	MS	
ZINC, TOTAL	63.1030		28.1010		43.76	80.0		75	125	MS	

Comments:

1 (J) in all samples not prev qual (-09)
2 prev qual in all samples for FCSA std
3 (prev qual for MSH in all samples
CR 10/30/10

FORM V (Part 1) - IN

		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 N/A			
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.)

.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.

.1.18.5 **Soil/Sediment**

.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

Al, Ca, Mg

	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

5D

SPIKE DUPLICATES

Lab Name: Katahdin Analytical Services | **Client Field ID:** PQIR-SS01-0405-0810

Matrix: SOIL | **SDG Name:** SD4910

Percent Solids: 84.0 | **Lab Sample ID:** SD4910-008

Concentration Units : mg/Kgdrywt

Analyte	Control Limits	Spike Result	C	Spike Dup. Resuit	C	RPD	Q	M	
ALUMINUM, TOTAL		23762.0788		35871.4957		40.6	*	MS	1
ANTIMONY, TOTAL		2.9145		2.3708		20.6	*	MS	
ARSENIC, TOTAL		8.3933		8.6436		2.9		MS	
BARIUM, TOTAL		268.0782		269.8150		0.6		MS	
BERYLLIUM, TOTAL		4.3980		4.6635		5.9		MS	
CADMIUM, TOTAL		20.7295		21.2765		2.6		MS	
CALCIUM, TOTAL		4091.6287		8050.7446		65.2	*	MS	1
CHROMIUM, TOTAL		39.3847		32.1751		20.1	*	MS	
COBALT, TOTAL		57.5454		58.9567		2.4		MS	
COPPER, TOTAL		62.0308		72.4869		15.5		MS	
IRON, TOTAL		29984.8552		33825.6813		12.0		MS	
LEAD, TOTAL		10.4063		11.3264		8.5		MS	
MAGNESIUM, TOTAL		3426.4655		5484.1775		46.2	*	MS	1
MANGANESE, TOTAL		748.5274		707.2009		5.7		MS	
MERCURY, TOTAL	0.04	0.2020		0.1928		4.7		CV	
NICKEL, TOTAL		56.6264		50.5874		11.3		MS	
POTASSIUM, TOTAL	440	1777.3422		2743.2511		42.7	*	MS	2
SELENIUM, TOTAL		7.9294		8.2251		3.7		MS	
SILVER, TOTAL		4.3148		4.2692		1.1		MS	
SODIUM, TOTAL		941.2934		1049.4098		10.9		MS	
THALLIUM, TOTAL		8.2139		8.5692		4.2		MS	
VANADIUM, TOTAL		152.0248		156.9233		3.2		MS	
ZINC, TOTAL		63.1030		73.2774		14.9		MS	

Comments:

(1) results >5x CRDL and RPD >35%; (J) in all samples
(2) results <5x CRDL and > ±4x CRDL; results prev qual for MS rec

CR 11/2/10

FORM VD - IN

		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: K			
	> ± 2 x CRQL?	___	[___]	✓
	> ± 4 x CRQL	✓	[___]	___

prov. qual

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 N/A

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.

.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.

.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. samples previously qualified			
.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.			
.1.20	**Laboratory Control Sample (LCS)- Form VII**			
.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

ASSOC w/ EB only

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".			
.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.			
.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.			
.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			
..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 DILUTION

Lab Name: Katahdin Analytical Services **Client Field ID:** PQIR-SS01-0405-0810L

Matrix: SOIL **SDG Name:** SD4910

Lab Sample ID: SD4910-008L

Concentration Units: ug/L

Analyte	Sample Result	C	Dilution Result	C	% Difference	Q	M	
ALUMINUM, TOTAL	14650.00		14700.00		0.3		MS	
ANTIMONY, TOTAL	1.34		1.43		6.7		MS	
ARSENIC, TOTAL	2.15		2.34	J	8.8		MS	
BARIUM, TOTAL	176.50		186.35		5.6		MS	
BERYLLIUM, TOTAL	0.81		0.83	J	2.5		MS	
CADMIUM, TOTAL	0.07	J	0.09	U	100.0		MS	
CALCIUM, TOTAL	14080.00		15205.00		8.0		MS	
CHROMIUM, TOTAL	34.88		35.52		1.8		MS	
COBALT, TOTAL	25.32		26.67		5.3		MS	
COPPER, TOTAL	112.80		120.60		6.9		MS	
IRON, TOTAL	76470.00		79700.00		4.2		MS	
LEAD, TOTAL	4.59		4.68		2.0		MS	
MAGNESIUM, TOTAL	10800.00		11905.00		10.2	E	MS	-prev qual
MANGANESE, TOTAL	238.80		240.00		0.5		MS	
MERCURY, TOTAL	0.05	J	-0.06	U	100.0		CV	NA
NICKEL, TOTAL	15.32		15.84		3.4		MS	
POTASSIUM, TOTAL	2833.00		3093.00		9.2		MS	
SELENIUM, TOTAL	0.93	J	2.32	J	149.5		MS	
SILVER, TOTAL	0.03	J	0.03	U	100.0		MS	
SODIUM, TOTAL	854.30		991.50	J	16.1	E	MS	1
THALLIUM, TOTAL	0.08	J	0.09	J	12.5		MS	
VANADIUM, TOTAL	247.00		252.20		2.1		MS	
ZINC, TOTAL	60.91		65.85		8.1		MS	

1 (J) in all samples

CR 11/2/10

FORM IX - IN

		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
.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.

.1.23 Field Blank - Form I
NOTE: Designate "Field Blank" as such on Form I

.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

		YES	NO	N/A
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

		YES	NO	N/A
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
.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.			
.1.24.3	**Linear Ranges - Form XI**			
.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.			
.1.25	**ICP-MS Tune Analysis - Form XIV**			
.1.25.1	Was the ICP-MS instrument tuned prior to calibration? raw data only	[✓]	___	___
	ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed.			
.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

raw data only

		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% 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

ıan the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

.1.27 Percent Solids of Sediments

.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.

norganic Data Review Narrative

ase# _____ Site: Vieques CTO 111 Matrix: Soil ✓

DG# SD4910 Lab: Katahdin Water ___

ampling Team: _____ Reviewer: Caroline Rowshan Other _____

.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 o: 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

Form I'S and the QC Form when a QC analysis is outside the control limits. These qualifiers are not applied on the Lotus or XLS spreadsheets. These qualifiers and their meanings are as follows:

N: This qualifier indicates the lack of accuracy in the reported result, and is applied when matrix spiked sample recovery is outside the control limits.

E: This qualifier indicates the the presence of interference, and is applied when the ICP serial dilution is outside the control limits.

*: This qualifier indicate the lack of precision , and is pplied on Fom I'S and Form VI when the Lab Duplicate analysis is outside the control limits.

U: This is a concentration qualifier that laboratory applies to a non-detected result which is essentially less than the Method Detection Limit(MDL). A non-detected result of an analyte is indicated by the Contract Required Quantitation Limit (CRQL) of that analyte suffixed with "U".

J: This is also a concentration qualifier that laboratory applies to a positive result below the CRQL.

NOTE: The laboratory qualifiers are crossed out and replaced with the appropriate data validation qualifiers (J, R or U) by the data validator.

A.2.3.1 Data Case Description:

A.2.3.2 CSF Audit:

.2.3.3 Technical Review:

.2.3.4 Contract-Problem/Non-Compliance:

HWSS Reviewer: _____ Date:_____
Signature

Contractor Reviewer: _____ Date:_____
Signature

Verified by: _____ Date:_____
Signature

Contract Laboratory Program
REGION II/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

CASE #

SDG #

See attached

Date of Call: _____

ESAT Reviewer/Date: _____

Type of Analysis: ___Inorganic_____

Laboratory Name: _____

Lab Contact: _____

Call Initiated By: ___Laboratory _X_Region II

Inquiry made in reference to data for the following sample number(s):

Summary of Questions/Issues Discussed:

ummary of Resolution:

ignature

Date: _____

FIELD DUPLICATES

ample No. Field Duplicate No. Sample Matrix: See attached

ab Code: Case No. : SDG No.:

Solids Sample: % Solids Duplicate:

Concentration Units (ug/l or mg/kg dry weight):

	Action Limit	Sample Concentration	C	Duplicate Concentration	C	RPD	Difference	Q	M
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									

Table 3 **Field Duplicate Sample Results for Total Inorganic Results**
Soil Duplicate Samples VEPQIR-SB02-0709-0810 and VEPQIR-SB02P-0709-0810

Analyte	Sample Results (µg/L)		Field Duplicate Results (µg/L)		RPD	FOOT NOTES
	VEPQIR-SB02-0709-0810		VEPQIR-SB02P-0709-0810			
Aluminum	39400	J	39200	J	1	1
Antimony	0.08	J	0.09	J	12	2
Arsenic	.64		0.53		19	2
Barium	224	J	121	J	60	1 *
Beryllium	0.34		0.4		16	2
Cadmium	0.08		0.05	J	46	2
Calcium	5370	J	6020	J	11	1
Chromium	27	J	26	J	4	1
Cobalt	18.4		21.4		15	1
Copper	85.4	J	77.2	J	10	1
Iron	39700		39200		1	1
Lead	2		2		0	1
Magnesium	4490	J	4340	J	3	1
Manganese	2360	J	1100	J	73	1 *
Mercury	0.01	J	0.01	J	0	2
Nickel	16.6	J	13.2	J	23	1
Potassium	1450	J	1480	J	2	1
Silver	ND		0.02	J	NC	2
Sodium	329	J	350	J	6	2
Thalllium	0.05	J	0.04	J	22	2
Vanadium	128		116		10	1
Zinc	33.5		29		14	1

1 Results > 5xLOQ; RPD <35%
2 Results < 5xLOQ; absolute difference <2xLOQ
* Precision criteria exceeded; however, previously qualified for ICS
NC Results not calculated due to one result was not detected (ND).
ND Not detected.

					YES	NO	N/A		
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

Total/Dissolved Concentrations

Lab Code Case No. SDG No. Sample Matrix: Water N/A

Concentration: ug/L

ANALYTE	TOTAL	C	DISSOLVED	C	DIFFERENCE	Q	M
ALUMINUM							
ARSENIC							
BARIUM							
BERYLLIUM							
CADMIUM							
CALCIUM							
CHROMIUM							
COBALT							
COPPER							
IRON							
LEAD							
MAGNESIUM							
MAGNESE							
MERCURY							

NICKEL							
POTASSIUM							
SELENIUM							
SILVER							
SODIUM							
THALLIUM							
VANADIUM							
ZINC							
CYANIDE							

CONTRACT LABORATORY PROGRAM
CLP RAS RE-ANALYSIS REQUEST/APPROVAL RECORD

N/A

ECTION A (TO BE COMPLETED BY REGIONAL SENDING OFFICIAL)

Case Number: _____
- OLM
- OLC
- ILM

nitiated By:

Name, Affiliation, Phone Number

_____

etails of Re-Analysis Request:

Laboratory Name /Contract Number: _____

Affected Sample Number(s) and Fraction(s): _____

Reason for Re-Analysis: _____

Contract Statement of Work Citation*: _____

_____

Comments: _____

* PROVIDE SOW CITATION THAT SUPPORTS THIS REQUEST

RE-ANALYSIS Billable ( ) Not Billable ( )

- Approved By: _____ Date: _____

Authorized Regional Sending CLP PO Signature

ECTION B (TO BE COMPLETED BY SMO)

ame of SMO Contact _____ Date: _____

Date of Laboratory Notification (Verbal): _____

Re-analysis Start Date: _____ Data Due Date: _____

Return completed form to:
Sample Management Office (SMO)

Distribtion: (1) CLP PO Copy (2) Regional Sending Official Copy (3) SMO File Copy (4) Laboratory Copy
Final 9/3/99

CLP DATA ASSESSMENT SUMMARY FORM (INORGANICS)

Type of Review: _____ Date: _____ Case# _____ SDG# SN4910

Site: Vieques - CTO-111 Lab Name: Katahdin

Reviewer's Initials: CK Number of Samples: 7

Analytes Rejected (R) Due to Exceeding Review Criteria

	Holding Time	CRQL Std	Blanks	ICS	Spike Recovery	Dup. Lab.	Dup. Field	LCS	ICP Serial Dilution	% Solids	Internal Std. ICP-MS	Tuning ICP-MS	Total Analytes	Rejection %
ICP-AES														
ICP-MS														
Mercury														
Cyanide														
Total														

Analytes Flagged (J) as Estimated Due to Exceeding Review Criteria

	Holding Time	CRQL Std	Blanks	ICS	Spike Recovery	Dup. Lab.	Dup. Field	LCS	ICP Serial Dilution	% Solids	Internal Std. ICP-MS	Tuning ICP-MS	Total Analytes	Rejection %
ICP-AES														
ICP-MS														
Mercury														
Cyanide														
Total														

See validation report for data qualifications

INORGANIC DATA VALIDATION SUMMARY

Site Name:	Vieques CTO-111	Laboratory:	Katahdin
Project Number:	617.90.01	Case/Order No.	SD4910
Sampling Date(s):	8/10, 8/11/2010		

Compound List: ☐ TAL ☐ Priority Pollutant ☐ Appendix IX ☑ Other cyanide

Method: ☐ CLP SOW ☐ 40 CFR 136 ☑ SW-846 Method 9012 ☐ Other _____

The following table indicates the data validation criteria examined, any problems identified, and the QA action applied.

Data Validation Criteria:	Accept	FYI	Qualify	Comments
Holding Times	✓			
Initial Calibrations	✓			
Continuing Calibrations	✓			
CRDL Standards NA				
Blank Analysis Results	✓			
ICP Interference Check Sample Recoveries NA				
Duplicate Results NA				
Field Duplicate Results	✓			
Spike Analysis Recoveries NA				
Serial Analysis Recoveries NA				
Laboratory Control Sample Results	✓			
Furnace AA QC Analysis NA				
Quantitation/Detection Limits	✓			
Overall Assessment of Data	✓			
Other NA				

General Comments:

Accept – No qualification required.
FYI – For your information only, no qualification necessary
Qualify – Qualify as rejected, estimated or biased
NA – Not applicable.
NR – Not reviewed.

QA Scientist CR
Date 10/28/10

Revised 12/11/2000

Sample_Name	Lab_Sample_ID	DateTime_	Extraction_	Analysis_D	EHT	AHT	Analytical_Method	SDG
VEPQIR-EB01-081010	SD4910-002	8/10/2010	8/17/2010	8/20/2010		10	6020	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/24/2010	8/25/2010		15	6020	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/24/2010	8/27/2010		17	6020	SD4910
VEPQIR-EB01-081110	SD4910-007	8/11/2010	8/17/2010	8/20/2010		9	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/24/2010	9/1/2010		21	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/24/2010	8/27/2010		16	6020	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/24/2010	8/25/2010		14	6020	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/24/2010	8/30/2010		19	6020	SD4910
VEPQIR-EB01-081010	SD4910-002	8/10/2010	8/17/2010	8/18/2010		8	7470A	SD4910
VEPQIR-EB01-081110	SD4910-007	8/11/2010	8/17/2010	8/18/2010		7	7470A	SD4910
VEPQIR-SS02-0304-0810	SD4910-003	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SB02-0709-0810	SD4910-004	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SB02P-0709-0810	SD4910-005	8/10/2010	8/18/2010	8/19/2010		9	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008P	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SS01-0405-0810	SD4910-008S	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-SB01-0810-0810	SD4910-009	8/11/2010	8/18/2010	8/19/2010		8	7471A	SD4910
VEPQIR-EB01-081010	SD4910-2	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SS02-0304-0810	SD4910-3	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SB02-0709-0810	SD4910-4	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-SB02P-0709-0810	SD4910-5	8/10/2010	8/18/2010	8/18/2010		8	9012	SD4910
VEPQIR-EB01-081110	SD4910-7	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910
VEPQIR-SS01-0405-0810	SD4910-8	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910
VEPQIR-SB01-0810-0810	SD4910-9	8/11/2010	8/18/2010	8/18/2010		7	9012	SD4910

10/28/10

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Blank Sample Summary Report

TOC in Soil

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG81226	Lloyd Kahn	13-AUG-10	N/A	U 300 ug/gdrywt	400 ug/gdrywt	300
MBLANK	WG81619	Lloyd Kahn	25-AUG-10	N/A	U 300 ug/gdrywt	400 ug/gdrywt	300

Total Cyanide

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG81165	SW846 M9012	18-AUG-10	18-AUG-10	U 8.0 ug/L	10. ug/L	8.0
MBLANK	WG81166	SW846 M9012	18-AUG-10	18-AUG-10	U 0.40 mg/Kgdrywt	0.50 mg/Kgdrywt	0.40

Total Solids

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL	LOD
MBLANK	WG81210	ASTM D2216	20-AUG-10	19-AUG-10	U 1 %	1 %	N/A

No Blank qual necessary.

ND > method Blanks & OCBs/EB's in

OR 10/25/10

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Laboratory Control Sample Summary Report

TOC In Soil

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG81226-2	LCS	WG81226	13-AUG-10	N/A	ug/gdrywt	400000.000	420000	106	80-120	
WG81619-2	LCS	WG81619	25-AUG-10	N/A	ug/gdrywt	400000.000	400000	101	80-120	

Total Cyanide

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG81165-2	LCS	WG81165	18-AUG-10	18-AUG-10	ug/L	200	180	90	80-120	
WG81166-2	LCS	WG81166	18-AUG-10	18-AUG-10	mg/Kgdrywt	10	9.0	90	38.4-162	

Total Solids

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG81210-2	LCS	WG81210	20-AUG-10	19-AUG-10	%	90	90.	100	80-120	

pH(Soil)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG80997-1	LCS	WG80997	13-AUG-10	13-AUG-10	pH	7	7.0	100	80-120	

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Duplicate Sample Summary Report

TOC In Soil

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG81226-3	SD4910-4	WG81226	13-AUG-10	ug/gdrywt	12000	13000	4	20

pH(Soil)

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG80997-2	SD4910-4	WG80997	13-AUG-10	pH	7.8	7.8	0	20

NA

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Katahdin
ANALYTICAL SERVICES

Cert No E87604

Quality Control Report

Matrix Spike Sample Summary Report

TOC In Soil

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG81619-3	MS	SD4910-8	WG81619	25-AUG-10	ug/gdrywt	10056.16	4000	14000	105	75 - 125
WG81619-4	MSD	SD4910-8	WG81619	25-AUG-10	ug/gdrywt	9612.81	4000	17000	140*	75 - 125
WG81226-4	MS	SD4910-4	WG81226	13-AUG-10	ug/gdrywt	10659.08	12000	24000	110	75 - 125

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Appendix E
Final Responses to EPA and PREQB Comments

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Final Responses to EPA Comments on the

Draft Site Inspection/Expanded Site Inspection Report Addendum PI 7, PAOC Q, and PAOC R Former Vieques Naval Training Range, Vieques, Puerto Rico

January 2011

Presented below are comments resulting from the review of the Draft Site Inspection/Expanded Site Inspection Report Addendum PI 7, PAOC Q, and PAOC R, Former Vieques Naval Training Range, Vieques, Puerto Rico.

1. Figure ES-1 and Figure 1-1: These figures imply that areas such as Isabel Segunda are within the Former Vieques Naval Training Range. Please correct.

   <u>Navy Response:</u>

   Figures ES-1 and 1-1 have been edited to more clearly show the Former VNTR area.

2. Section 3.3, PI 7 Release Assessment Decision Analysis, Step 6: *Can more realistic evaluations of the data be performed, and if so, do they suggest contaminant levels warrant no further investigation or action? Ecological Evaluation, page 3-9:* The arithmetic mean concentrations of selenium should be discussed and compared to the ecological soil screening value. There should be some discussion regarding the range of non-detect values which appear to be greater than the screening value, and result in a mean concentration greater than the maximum concentration detected.

   <u>Navy Response:</u>

   A discussion of the mean selenium concentration and the range of non-detected values for this constituent have been added to the document. The selenium bullet has been revised to read:

   > "Selenium, which was detected in 3 of 9 surface soil samples (it was not analyzed for in the tenth sample), exceeded the ecological screening value (0.52 mg/kg) in 2 of the 9 samples at a maximum HQ of 1.15. The mean HQ (1.48) also exceeded 1, and is higher than the maximum HQ because half the reporting limits for non-detected constituents were used, including ones where the non-detect reporting limits exceeded the screening value (i.e., 3.6 and 3.8 mg/kg, where values of 1.8 and 1.9 mg/kg, constituting one-half of the sample reporting limit, were when calculating the mean). The other four non-detect samples had non-detect values (i.e., one-half of the sample reporting limit) that were less than the ecological screening value. Although the background UTL for selenium in this soil type is 0.51 mg/kg, selenium concentrations up to 1.3 mg/kg were detected during the East Vieques background soil inorganics investigation in nearby soil types

(CH2M HILL 2007). This suggests that the selenium concentrations detected in this portion of PI7 (maximum of 0.60 mg/kg) may be within the range of background. Further, the screening value (0.52 mg/kg) is based upon potential impacts to plants. The site is heavily vegetated, with no apparent impacts to the terrestrial plant community. Maximum concentrations (and maximum reporting limits for non-detect samples) are less than soil screening values based upon other receptors (e.g., 4.10 mg/kg for soil invertebrates)."

3. Table 3-1, Surface Soil Detection and Exceedance Results: Please clarify that the screening level for chromium is for hexavalent chromium and add the appropriate footnote.

<u>Navy Response:</u>

The screening values used for the Adjusted RSL for Residential Soil and the SSL (DAF = 1) are for hexavalent chromium. The screening values for Background UTL (KTd) and Eco (E) are based on total chromium. Hexavalent chromium was not analyzed for during the east Vieques background investigation. The Eco (E) screening value for hexavalent chromium is 0.4 mg/kg; however, this value is not presented in Table 3-1 because it was not included in the ERA protocol. The following footnote has been added under "Notes" for the screening values for chromium in the Adjusted RSL for Residential Soil and the SSL (DAF = 1): "[1] The screening value for hexavalent chromium was used."

4. Figure 3-1, PI 7 Central Subsection – Former Quarry: It would be useful to include the sampling dates in the legend.

<u>Navy Response:</u>

The sampling dates have been added to the legend.

5. Table 3-3, HHRA COPC Summary Table:

The detection frequency for surface soil and subsurface soil is confusing. Surface soil should represent samples collected from 0 - 2 feet, while subsurface soils are 0 - 6 feet. Therefore, the subsurface data set should include all data from the surface soil data set. Please explain why the surface soil dataset is larger than the subsurface soil dataset.

<u>Navy Response:</u>

The subsurface soil summary was replaced with a "total soil" sample grouping comprised of surface soil (0-2 ft) and subsurface soil (>2 ft). Surface soil and total soil risk estimates were revised accordingly (see revised Table 3-3 attached).

6. Please clarify if the calculations for surface soil for the resident include ADAF adjustments for PAHs, which act through a MMOA. If not, these should be revised to include the appropriate age adjustment factors.

Navy Response:

Yes, the calculations for surface soil include ADAF adjustments for PAHs; the risk estimates are extrapolated directly from the residential RSL, which incorporates ADAFs.

7. Table 4-3, HHRA COPC Summary Table: Please correct the errors in the "frequency of criteria exceedance" column. For example, the frequency of exceedance for vanadium is 8 out of 2.

Navy Response:

The table has been corrected and is attached (see revised Table 4-3 attached).

8. Tables 5-3, HHRA COPC Summary Table, and 5-4, HHRA COPC Summary Table Supplement: Since the total HI value exceeds 1.0, please provide a breakout table of HI values based on target organ.

Navy Response:

All target-organ specific HIs are already presented on Table 5-4 and are associated with an individual chemical, with the exception of the central nervous system (CNS) HI, which is shown to have an HI of 1.1 based on two chemicals. The table was revised to clearly indicate that the HI of 1.1 is associated with the CNS target organ (see revised Table 5-4 attached).

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Final Responses to PREQB Comments on the Draft Site Inspection/Expanded Site

Inspection Report Addendum, PI 7 and PAOCs Q and R, Former Vieques Naval Training Range, Vieques, Puerto Rico,

Dated January 2011

Page-Specific Comments

1. Sections 4.2 & 5.2: Please provide additional detail on the methods used to identify the cover material classified as soil/gravel that was removed and set aside prior to sampling. No visible fill/native soil interface was documented in the soil boring log for SS/SB01. Please add text indicating how the depth of the fill material was determined at this sample location. Also, please include a brief description of the native surface organic layer observed at 3.0 to 3.5 feet bgs at SS/SB02 in the text of Section 5.2.

   Navy Response:

   VEPQ/R-SS/SB01: The surface fill material at this location was identified by its resemblance to PAOC Q and PAOC R historical sample locations fill material, a gravelly well graded sand or sandy gravel. Gravelly well graded sand is fill material that is noted as being present on the original boring log from 0.0-2.2′ bgs. Well graded sand with gravel was observed from 2.2-3.2′ bgs. The sand from 0-3.2′ bgs was observed to be loose which is another characteristic of fill material, being that it was not naturally deposited at this location. In addition, the original land surface elevation (i.e., where fill was placed) is visible immediately adjacent to the sampling location.

   A visible fill/native soil contact was noted on the boring log at 4.0′ bgs as "natural organics within this interval appears to be old topsoil layer." Dried and partially decomposed plant matter was observed and trace fine root structure was visible within the soil. To further support that this was the old topsoil layer, the underlying soil from 4.2-5.0′ bgs was noted to be silt with fine sand, and its consistency was noted as dense.

   This information has been added to Section 4.2.

   VEPQ/R-SS/SB02: The surface fill material at this location was identified by its resemblance to PAOC Q and PAOC R historical sample locations fill material, a gravelly well graded sand or sandy gravel. Loose gravel with sand is noted as being present on the original boring log from 2.0-3.0′ bgs.

   The visible fill/native soil contact is noted at 3.0′ bgs and was observed as dried plant matter. This shows the division between fill and historical surface soil. The dried plant matter had a fine root system that was observed in the underlying soil. Additional support that this was the fill/native soil contact was that the underlying soil was noted to be well graded sand with trace clay with a distinct color change from that of the fill (from brown to dark yellowish brown), as well as its density being medium dense.

This information has been added to Section 5.2.

2. Page 3-2, Supplemental SI/ESI Soil Sampling: Please revise the text of the first paragraph to indicate that select SVOCs were analyzed for and provide the rationale for only analyzing for select SVOCs.

Navy Response:

The rationale for analyzing for select SVOCs is already included in the first paragraph of Section 3. However, the last sentence of the first paragraph under "Supplemental SI/ESI Soil Sampling" has been replaced with the following: "Both samples were analyzed for select SVOCs because PAHs were the only contaminants of potential concern identified in the SI/ESI Report as potentially contributing to unacceptable human health risk at this location. This sampling protocol was in accordance with the Final SI/ESI Report (CH2M HILL, 2010)."

3. Page 3-8, Section 3.3, Ecological Evaluation: As noted in PREQB's comments on the Site Inspection/Expanded Site Inspection Report (please refer to PREQB General Comment 11), please include a brief description of the habitat quality for avian receptors at PI 7 and clarify why avian ecological soil screening criteria values were not considered for this site as median core area sizes of pearly-eyed thrashers in Puerto Rico during egg and nestling stages have been recently reported to be approximately 0.22 to 0.35 acres (Beltran et al., 2010) which would appear to be within the limits of PI 7.

Navy Response:

The first bullet under "Ecological Evaluation" has been revised to read:

> "The portion of the site evaluated, constituting the area surrounding former sample PI7-3, is entirely forested and may provide suitable habitat for avian receptors such as the pearly-eyed thrasher. However, this portion of the site is only about 0.5 acre in size. While the size of this area is slightly larger than the core home range for an individual pearly-eyed thrasher during some portions of the nesting season, it is well below the size needed to support a breeding population of this species; populations, not individuals, are the focus of the assessment endpoints for these types of receptors. Further, the habitat quality in this portion of the site is generally uniform. Thus, the chances that an individual thrasher would have its entire core home range located within the area evaluated is small. More likely, only a small portion of its core home range would overlap the area evaluated and a portion of its foraging would also be expected to occur outside of the core area. Thus, exposures to upper trophic level receptors such as the pearly-eyed thrasher are not considered significant enough to warrant inclusion in the ecological evaluation."

Appendix C

1. Section C.0, Paragraph 4: Minor editorial comment - Please revise the text to refer to PAOC Q instead of PAOC R and to August 11, 2010 instead of August 10, 2010.

Navy Response:

The above mentioned edit has been made.

Reference

Beltran, J., W. Wunderle, Jr., and W.J. Arendt. 2010. *Changes in home range of breeding and post-breeding male Pearly-eyed Thrashers in the Luquillo Mountains of Puerto Rico.* Ornitologica Neotropical 21: 409-423.

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